

THE NEUROSCIENCE OF LEADERSHIP

**A PROJECT SUBMITTED TO MIDDLESEX UNIVERSITY
FOR A PROFESSIONAL DOCTORATE**

David Rock

**INSTITUTE FOR WORK BASED LEARNING
MIDDLESEX UNIVERSITY**

March 2010

**ABSTRACT FOR A PROFESSIONAL DOCTORATE IN THE NEUROSCIENCE OF LEADERSHIP BY
DAVID ROCK**

This doctorate summarizes 13 years of thinking, experimentation and research into the issue of improving human performance. Specifically, the issue of how to drive change in human performance, through conversation. This focused on non-clinical populations, and generally with very high functioning people.

My work initially focused on the act of ‘coaching’. At its simplest, coaching is the ability of one person to enable another to improve their performance. Through intensive observation, I built a coaching model that enabled a significant improvement in people’s ability to facilitate behavior change in others. The model was based on the realization that people needed the ‘aha’ moment for change to occur. An effort was made to understand how to best bring others to their own insights. An approach was developed into a set of codified techniques and taught to thousands of professionals worldwide, including inside large organizations.

Through a desire to understand the deeper mechanisms occurring in moments of insight, I became fascinated with brain research. Initially focused on the neuroscience of insight, I soon became interested in the neuroscience behind other mental experiences central to effective workplace functioning, such as self-awareness, social skills, decision-making, and emotional regulation.

Because no formal body of knowledge existed that explained the neuroscience underneath everyday work situations, I reached out to and was mentored by specific neuroscientists. I soon saw value in creating a field of study that brought neuroscience research into the field of coaching, leadership development and organizational change. A new field of knowledge was created, called the Neuroscience of Leadership, which is now being driven by an institute, an annual summit, a journal and academic education.

This thesis explores my 13-year learning journey, the key research that was undertaken, the mentors who supported my learning and the publications I produced. It finishes with a discussion about the development of the Neuroscience of Leadership field, and the future of that field.

Please note there are four categories of headings in this submission:

The Learning journeys are listed in SMALL CAPS

Circuit development (skills) are listed in *italics*

Research methods are listed in **bold text**

Papers and books are listed in **bold text**

Introduction	4
LEARNING JOURNEY ONE: AN INTENSELY CURIOUS MIND FOCUSES INWARD	8
<i>The first level of circuit development: self and social circuits</i>	9
<i>The second level of circuit development: self-regulation</i>	9
<i>The third level of circuit development: effective oral communication</i>	9
LEARNING JOURNEY TWO: THE WORLD OF BUSINESS	10
<i>The fourth level of circuit development: effective written communication</i>	10
<i>The fifth level of circuit development: coaching others on their goals</i>	10
Research methods one: trial and error, feedback and discussion	11
<i>The sixth level of circuit development: the creative process</i>	11
<i>The seventh level of circuit development: training coaches</i>	11
Research methods two: collecting data	12
LEARNING JOURNEY THREE: RESULTS COACHING SYSTEMS (RCS) BEGINS	12
Book one: Personal Best	13
LEARNING JOURNEY FOUR: A RUN-IN WITH ACADEMIA	14
LEARNING JOURNEY FIVE: UNPACKING COACHING CONVERSATIONS	15
Research methods three: live activities and data collection	15
LEARNING JOURNEY SIX: A BIG INSIGHT ABOUT INSIGHT	16
Research methods four: testing a new coaching approach	19
Book two: Quiet Leadership	21
LEARNING JOURNEY SEVEN: WORKPLACE COACHING BEGINS	21
LEARNING JOURNEY EIGHT: TEACHING AT NEW YORK UNIVERSITY	22
Research method five: researching through teaching	23
<i>The eighth level of circuit development: linking to other domains of knowledge</i>	24
Book three: Coaching With the Brain in Mind	24
LEARNING JOURNEY NINE: ORGANIZATIONAL APPLICATIONS OF COACHING	24
Research methods six: organizational impact and ROI studies	25
Paper three: Driving change with internal coaching programs	27
<i>The ninth level of circuitry development: thinking about coaching from the perspective of the brain (and not psychology)</i>	28
Research methods seven: building a research group	30

Neuroscience mentor one: Dr. Mark Jung-Beeman	30
Neuroscience mentor two: Dr. Jeffrey M. Schwartz	31
Paper one: the neuroscience of leadership	32
Paper two: a brain-based approach to coaching	33
LEARNING JOURNEY TEN: ANOTHER RUN-IN WITH ACADEMIA THROWS UP A DETOUR	34
Neuroscience mentor three: Dr. Yi-Yuan Tang	37
LEARNING JOURNEY ELEVEN: GOING ON FACULTY AT CIMBA	37
LEARNING JOURNEY TWELVE: THE EMERGENCE OF NEUROLEADERSHIP	38
LEARNING JOURNEY THIRTEEN: BIRTH OF THE NEUROLEADERSHIP SUMMIT	39
Research methods eight: interviewing scientists and reading their papers	40
Neuroscience mentor four: Dr. Matthew Lieberman	41
Neuroscience mentor five: Dr. Kevin Ochsner	42
Book four: Your Brain at Work	42
Paper four: The SCARF model	44
LEARNING JOURNEY FOURTEEN: 2008 NEUROLEADERSHIP SUMMITS	45
LEARNING JOURNEY FIFTEEN: THE NEUROLEADERSHIP JOURNAL	46
Paper five: The emerging field of NeuroLeadership	47
LEARNING JOURNEY SIXTEEN: NEUROLEADERSHIP INSTITUTE AND RESEARCH	47
LEARNING JOURNEY SEVENTEEN: POST-GRADUATE CERTIFICATE	48
Arguments for and against NeuroLeadership	48
The impact of writing this submission	57
Where the NeuroLeadership field is heading	57
Summary of my learning journey and impact	59
References	62
 APPENDICES:	
Appendix 1: List of all public works	73
Appendix 2: List of all neuroscience mentors	73
Appendix 3: List of all printed appendices included with this submission	75

1. INTRODUCTION

Neuroscientist Dr. Daniel J. Siegel says that human beings increase their effectiveness as their brains develop a higher degree of integration (Siegel, 2007a). Integration means that the functions of the brain become independently healthy and well connected to other functions (Siegel, 2007; 2007b).

A well-integrated brain responds to the world adaptively (Heifetz, Linsky & Grashow, 2009), using just the right strategy for each situation to maximize goal achievement. In a workplace setting, the goals can be your own, your team's or your organization's, adding to the complexity of, and the urgency for, highly adaptive and therefore integrated brains in organizational settings.

A well-integrated brain has strong neural connections between the prefrontal regions, the seat of conscious control and language, and the rest of the brain (Goldberg, 2009). The prefrontal region is the most widely connected region of the brain, linked directly to every other major region (Goldberg, 2009). People without good connections between prefrontal and other regions suffer from problems such as an inability to control emotions and impulsive behavior (Davidson, Putnam & Larson, 2000). These people also have trouble using words to identify their emotional states. Whereas people who practice putting words on mental experiences through mindfulness meditation develop a thickening of their cortex in regions responsible for controlling and shifting attention (Brefczynski-Lewis et al, 2003). Studies such as these point to the idea that strong neural connections develop between the prefrontal regions and the rest of the brain as a result of having a large set of language (which equates to a larger number of circuits in the prefrontal cortex), for subtle patterns of experience (Pinker, 1999).

As experiences occur, you are able to apply language, which means you recognize meaning, and through having this language you can recognize different choices of action (Schwartz & Begley, 2003). For example, there are times when it is better to focus closely on a problem, and times when it is better to be unfocused and let new thoughts emerge into mind (Kounios et al, 2006). You can more easily recognize which strategy to choose, if you have words to articulate the differences between these two situations. Without specific language for the two situations, it is more likely you will have automatic, 'non-adaptive' responses to events. This idea that language provides choices is detailed in 'Your Brain at Work' (Rock, 2009b, pp. 52-57).

The concept of neural integration is the biological underpinning of what is loosely called 'self-awareness' (Harmon-Jones & Winkielman, 2007).

Studies suggest that knowing oneself, as evidenced by high ratings on a mindfulness scale (Brown & Ryan, 2003) has a positive impact on wellbeing (Brown & Ryan, 2003) and relationships (Barnes et al, 2007). Knowing oneself also positively impacts on one's ability to regulate emotions (Creswell et al, 2007), where one's level of mindfulness is directly correlated to the level of dampening of amygdala activity that occurred during one's labeling of emotions. Many studies show that the ability to regulate emotions, often called 'emotional intelligence', is a key success factor in many jobs today (Druskat, Sala & Mount, 2005).

Studies of the medial prefrontal cortex show that similar circuits are used to know oneself as are used to know others (Uddin et al, 2007). This explains why the idea that increasing self-awareness increases social awareness is becoming more accepted in neuroscience (Block-Lerner et al, 2007). One practical application of the insight that knowing yourself helps you know others, is the use of mindfulness training to increase empathy in medical students (Hassad, 2008).

'Mindsight', a term coined by neuroscientist Dr. Daniel Siegel (2008), describes this awareness. According to Siegel, 'mindsight' is the capacity for insight and empathy. He says, "It is based on the ability of the human mind to see itself: to know one's own mind and to be able to perceive the minds of others." The opposite of 'mindsight' is 'mind blind', a term used to describe the experience of not being able to correctly interpret others' mental states (Baron-Cohen, 1997). This condition is often found in autistic people and sharply contrasts with mindsight.

In organizational settings, similar capabilities are referred to as emotional intelligence, self-awareness, social skills, human skills and soft skills. In this paper I will define 'Neural Integration' (NI) as *having language for mental experiences, your own and others, such that you are able to respond most adaptively to situations*. Ultimately NI may have the same meaning as mindsight; the difference being that it is expressed in neurological way.

"Between 1300 and 1660 the design of ploughs did not alter across Northern Europe." (De Botton, 2004, p. 102). On the other hand, today's pace of change requires a high level of adaptability, and therefore neural integration, in order to achieve individual and organizational success. I propose that the application of

neuroscience research can improve the effectiveness of interventions intended to increase neural integration in organizational settings. This is not unimportant: according to Beer & Nohria (2000), approximately two thirds of organizational change efforts fail, or deliver average results (Ringleb & Rock, 2008, p. 3).

As you will read in this submission, my goals have evolved over time. Over the last five years, my primary goal has been the creation of a language based on neurological functioning for the fields of leadership development, leadership, change management and other domains of human change. While this new language may illustrate events described by other disciplines (such as art, poetry, psychology and sociology), I propose a neurological framework, which is more suitable to rational business leaders. I further propose that providing organizational audiences with a more accessible language for everyday mental experience will facilitate the development of integrated brains, because attention itself is a key driver of neural change (Rock & Schwartz, 2006). In addition, this new language will open opportunities for accurate intervention measurement tools (Gordon, 2008), as well as provide insights into effective leadership design, learning and change initiatives (Ringleb & Rock, 2008).

To achieve this goal, I have developed a new field of study, called NeuroLeadership. I first coined the term 'NeuroLeadership' in 2007 when I was creating the first summit, along with Dr Al Ringleb, to gather researchers to discuss this field (McGregor, 2007). Since then I have further developed the field by running an annual summit of researchers and practitioners, creating a pedagogy to define NeuroLeadership as a field of study, launching formal education programs, undertaking research, coordinating other peoples' research and producing an annual research journal. While there are still an enormous number of things to research, I believe that this work has laid a foundation that will enable and organize future research.

About the structure of this submission

In this submission I will lay out a total of 17 separate learning journeys that have made up my overall journey of discovery over my career. These journeys will illustrate how my work has contributed, initially to the field of executive and personal coaching, and ultimately to the establishment of the NeuroLeadership field. The respective learning journeys follow a chronological story of my learning experiences focusing on key

events in my learning journey. Within each journey I have focused on the following five themes.

1. The skills and knowledge that I acquired through my learning journey, described in layers or 'circuits' that represent specific brain network development.
2. Research methods evolved over time.
3. Four books, each representing three to five years of research.
4. Five published papers.
5. My primary mentors.

The final four sections comprise:

1. Arguments for and against the NeuroLeadership field.
2. Reflections on the impact of producing this submission.
3. Speculations as to where the NeuroLeadership field is heading.
4. Summary of my learning journey.

LEARNING JOURNEY ONE: AN INTENSELY CURIOUS MIND FOCUSES INWARD

I began life with an intensely curious mind. By age ten I had taken everything apart, from motors to radios to the television, to see how the mechanical world worked. In my mid teens this curiosity diverted to the inner world. I read Buddhist philosophy, popular psychology and numerous brain books. I also developed a fascination for science, especially physics, and a love for creativity, both of which endure to this day.

At 15, I became fascinated by ideas of self-actualization (Maslow, 1998), finding your purpose and being your authentic self. I also discovered meditation (Kabat-Zinn, 2008) and practiced regularly for five years, focusing on forms that observed mental processes. My biggest learning at this time was that individuals don't have to be victims of their circumstances; that they can play an active role in creating themselves, and therefore influence how they perceive and shape the world. These thoughts and experiences were the beginning of my fascination with a constructionist approach to life (Guterman, 1994). Although, in these early stages, the approach was more therapeutically than performance focused, the ground was laid for the idea that the mind could change the brain.

Between 16 and 18 years old, I trained as an assistant on various meditation and personal development workshops, often based on humanistic counseling techniques (Rogers, 1995). I found this work compelling, and started to run mindfulness meditation classes for teenagers. I soon became addicted to the feeling that occurred when I sensed I made a difference in other peoples' lives. In a sense, this was an early addiction to increasing neural integration in others.

While this was an exciting time, I remember feeling some disquiet. The premise that life would be perfect if only you could know yourself completely seemed to lead to people becoming overly interested in their internal issues and focused on their own problems. This did not translate into them living better lives. In hindsight, I saw this as a problem-focused approach, based on clinical models of mental health applied to mentally well people. It became apparent that I had yet to discover a purely solution-focused approach (O'Connell, 2005) that didn't require going into the past.

THE FIRST LEVEL OF CIRCUIT DEVELOPMENT: SELF AND SOCIAL CIRCUITS

By 19 I had finished with meditation and personal growth classes. Through practicing mindfulness meditation, I had increased my cognitive control, my ability to focus attention, and my capacity to 'label' emotional experiences (Ochsner & Gross, 2005). Noticing internal signals had increased my ability to sense what was going on for others emotionally (Uddin et al, 2007). I had a high level of neural integration, especially for my age.

Being so aware of internal signals made me passionate about the phenomenological approach (Langdridge, 2006) although I didn't know the word at the time. I was dedicated to learning through observation. However, this also meant I wasn't particularly interested in academic learning.

At 18, spurred on by my parents who had invested heavily in my education, I considered the study of psychology but was horrified by the then current theories regarding behaviorism (it was the 1980s). Having vastly different interests than my peers, being uninterested in academia, and possessing a strong distaste for behaviorism meant I had to find my own path.

THE SECOND LEVEL OF CIRCUIT DEVELOPMENT: SELF-REGULATION

At 19, despite having high neural integration, I was socially shy and awkward. I was drawn to experiences that would make me stronger in the face of social rejection. These ranged from market research to interviewing and direct sales. This period of several years significantly built up my self-regulation circuitry, which I later learned was critically important for maintaining prefrontal function in the face of stressors in life (Ochsner & Gross, 2005).

THE THIRD LEVEL OF CIRCUIT DEVELOPMENT: CIRCUITS FOR EFFECTIVE COMMUNICATION

During this same period I also learned how to help others regulate their emotions. I built circuits for speaking confidently in public. This was something I couldn't have done before developing my own self-regulation circuits. To motivate others, I drew on my counseling training, but found that delving into peoples' 'issues' often failed to motivate them. I experimented with many approaches and soon found that a constructivist approach of identifying goals and building on successes was more effective (Guterman 1994).

LEARNING JOURNEY TWO: THE WORLD OF BUSINESS

During my next period I became an entrepreneur and started my own business. I learned about branding, publicity, marketing, advertising, packaging and financials. Building a business helped increase my emotional regulation capacity, especially under increased amounts of complexity.

By 1995, after several years in business, I became intellectually bored, and took a sabbatical to reflect upon and develop a deeper understanding of what I had learned and experienced up to this point in my life.

THE FOURTH LEVEL OF CIRCUIT DEVELOPMENT: CIRCUITS FOR EFFECTIVE WRITTEN COMMUNICATION

During this sabbatical I enrolled in several creative writing courses. I learned how to separate writing from editing, and how to find my 'authorial' voice. I developed new circuits, built on a foundation of my existing ones. For instance, I used my self and social circuits to process what I was sensing. My emotional regulation circuits helped inhibit my internal editor. I also drew upon circuits for delivering effective group communication.

During this time, I learned that great movies and books involve people making discoveries about themselves or others (Fisher, 1987). These discoveries help the reader or watcher learn too. It became clear that narratives are about creating greater integration. This insight influenced my whole coaching approach, and will be explored in detail in a subsequent section of this submission.

To create integration in narrative form, complex ideas need to be 'packaged' so they can be 'digested' by people. Ideas need to be simplified, stories told and connections made for people (Heath & Heath, 2007) to ensure ideas stick and are passed on. Becoming a change agent required me to master many forms of communication.

THE FIFTH LEVEL OF CIRCUIT DEVELOPMENT: COACHING OTHERS ON THEIR GOALS

About half way through my sabbatical I met my now wife, Lisa,. When we started dating, Lisa and I, both on a work break, often met friends for coffee. I invariably asked people what they were working on and interesting project details often emerged: a start-up company, growing a business, a desire to be more balanced. I naturally started helping people think about their goals; and, as a result, people

asked to meet again. Before long I noticed how useful these conversations had become and decided to formalize my sessions and charge for them.

Commencing in 1996, I spent 18 months coaching 30 people on various projects. I became fascinated by the best processes for coaching and continuously improved my methods as I went. This was another integration opportunity. To coach others I needed to activate my self and social circuits, my emotional regulation circuits, my ability to influence others and my ability to create a story. I wanted to help others create real change, not just have insights. I was also influenced by my business experience so I knew it was important to get results, not just ideas. I realized people could have breakthroughs if I could reproduce what happened in a book or movie: to create a narrative where a character goes on an emotional journey. So I created a coaching model based on goals that had real deadlines, and held people accountable for achieving these goals (Rock, 2003).

RESEARCH METHODS ONE: TRIAL AND ERROR, FEEDBACK AND DISCUSSION

I wanted to discover how to create the best possible coaching system. My first approach to research was intuitive and involved testing ideas. I did this in an undocumented way, by discussing my insights with others in semi-formal meetings, during which we would debate different approaches. I didn't keep notes, but rather applied insights to the next coaching sessions. Over time I trialed helping people set one, two or three goals. I discovered people did best with three. I tried sessions that went for hours, but found that more was achieved in less time, so stuck to an hour. The focus reduced unhelpful conversational potholes. I tried various course lengths and found that 90 days was an ideal timeframe.

THE SIXTH LEVEL OF CIRCUIT DEVELOPMENT: THE CREATIVE PROCESS

While working on coaching systems, I worked on other projects in parallel. I wasn't entirely certain of my eventual focus. Using my creative skills, I formed a joint venture with an award-winning Australian advertising agency. I learned how to write creative briefs, come up with ideas and create brands. This set of circuits would prove useful later when I was trying to make complex ideas and activities more accessible, such as writing books.

THE SEVENTH LEVEL OF CIRCUIT DEVELOPMENT: TRAINING COACHES

Many people I initially coached asked if I could teach them to coach too. To them, coaching looked like a great way to earn a living. At the time, I had no idea if I could

replicate my coaching skills, as I hadn't fully articulated them. However, the challenge appealed to me as a way to achieve another possible level of integration. Also, I could see that by training coaches I could have a greater impact than one-to-one coaching.

In 1997 I formed a small group of people I'd coached. We met periodically to work on teaching others to coach. We did this by deconstructing what I did with them individually. In hindsight, the process was reminiscent of the research methods behind developing T-Groups, the 1960s transformational workshops Art Kleiner writes about in 'The Age of Heretics' (Kleiner, 2008). While this approach was not very academic, it did output substantial insights. Our group met for nearly a year and over this time I created 100,000 words about the coaching process, focused on the 90-day journey.

RESEARCH METHODS TWO: COLLECTING DATA

With a relatively short period of time, a few members of the group had coached over 125 others using the documented approach. We knew the coaching was working based on client feedback, but I wanted data to convince others. We started to gather formal feedback, collecting 'session 12 reports' that identified the goals that were set in coaching and how many were achieved. The first and second time we did this, over 85% of the goals were achieved during the coaching engagement (Rock, 2009b, pp. 491-493).

The big learning from this process was that the coaching model consistently worked. Most coachees achieved at least one goal in full, many of them two and some all three. This was a great result given that the goals were designed to challenge and stretch the coachee.

The research findings instilled confidence in me that my coaching approach was working and that it was possible for me to train other people to do what I did. I was excited by the impact that training multiple coaches could make.

LEARNING JOURNEY THREE: RESULTS COACHING SYSTEMS (RCS) BEGINS

In mid 1998, Lisa and I decided to wind back our creative projects and focus on building a coaching organization. Around our kitchen table we decided our vision was to 'create the most sought after coaches in the world'.

The first formal coach training program began in September 1998 in Sydney. The program ran initially for three weekends and 12 evening sessions, then weekly sessions for a year. I focused on mapping the 90-day coaching process in detail, outlining how each session worked and further explaining each element of these sessions so people could reproduce how I coached.

Within a year I had edited and compiled the 100,000 words I had written the previous year into a 600-page manual detailing how to run coaching engagements (Rock, 2009a).

I then codified the ideas into formal training programs and trainer-training programs. By the year 2000, I had developed a team of trainers who led dozens of groups of 12-24 people each year, teaching them how to coach. This happened in several cities in Australia as well as in New Zealand, the UK and the US.

BOOK ONE: PERSONAL BEST

I put everything I had noticed about the 90-day coaching model and the basic principles of coaching into 'Personal Best' (Rock, 2003). 'Personal Best' illustrated the three-month coaching journey, in a 'fly-on-the-wall' format. It was based on three hypothetical coaching engagements, which were composites of common personal, small business and executive coaching situations. It had lists of actions for different stages of these coaching journeys. The book helped people 'see' what a coaching journey was like. It became a required text in my coach training courses, but never received wider acclaim. It helped people who studied my method (I knew this because many coaches showed me how much they had marked up the book), but it only sold 10,000 copies. It was also republished in Russian, though I am not sure why! Even though I knew that peoples' lives were being improved through being coached, getting this across in a book wasn't easy. (I knew coaching was working because we continued to measure the number of goals that were achieved for a few years. We found on average 85% of coaching goals continued to be achieved).

Based on a request from my publisher I rewrote 'Personal Best' in 2007, adding brain science material up front and revising the resources. I decided not to amend the body of the text, as there was still value in the core goal of the book, which was to enable readers to 'see' some coaching journeys. Additionally, by this time, I had addressed the deficiencies in this book by writing new books including 'Quiet

Leadership' (Rock, 2006) and 'Coaching with the Brain in Mind' (Rock & Page, 2009).

LEARNING JOURNEY FOUR: A RUN-IN WITH ACADEMIA

Around the year 2000 I noticed that universities were starting to launch coaching programs. I discovered this by meeting students of these courses at coaching conferences in Australia and the US. (I attended four of the big coaching conferences in the USA from 1998 to 2005). At one of these conferences I heard from students who had reviewed 'Personal Best' as an assignment. They commented that their class felt that the book had no 'substance' or theory base and was just 'a set of observations', as if this was something terrible. To me, to observe accurately and describe observations was a difficult, yet totally valid approach to creating knowledge. This was my first engagement in the battle between theory and observation and it was surprisingly painful. I had never felt that theory was missing when I observed what worked in coaching; instead I felt I had invariably uncovered useful insights. Yet it didn't feel good to be attacked by people, especially smart people. I also sensed this debate might be a threat in the future.

Now that I understand the theoretical foundations to coaching, I know that from 1996 to the early 2000s I was building a coaching approach that was part solutions-focused therapy, part positive psychology and part change-management, combined with cognitive behavioral therapy, and delivered in short bursts with high-functioning people. Through observation, I had verified that having people articulate their goals rather than their problems was useful, as other solutions-focused therapy researchers had reported (O'Connell, 2005). I had seen that focusing on peoples' strengths rather than on their weaknesses was helpful, as the positive psychology theorists were learning (Seligman, 2005). I had seen that putting milestones and structure into a change process helped people change, as change management consultants like John Kotter had observed (Kotter, 1996). I had seen that working with peoples' thinking to change their thought patterns was the key, as the cognitive therapists were practicing (Schuyler, 1991). I was able to come to these conclusions because I had well-developed circuits for observing human mental experience (both my own and others), and through trial and error, without accessing other theories directly. Perhaps I indirectly imbibed them through earlier personal growth workshops, but I wasn't reading or studying any of these fields at the time.

In hindsight, I understand why academics attacked me: I was ignoring hundreds of years of research and arrogantly thinking I could create something new. Yet in my mind I wasn't arrogant, I was blissfully ignorant. I didn't know about other knowledge. I believe that this innocence enabled fresh observations, such as noticing how much coaches inadvertently tend to think for the coachee, a core idea in 'Quiet Leadership' (Rock, 2006). I probably would never have noticed this finding if I was simply building on existing theory and not making fresh observations.

LEARNING JOURNEY FIVE: UNPACKING COACHING CONVERSATIONS

After a few years teaching coaches, it seemed I had gone as far as I could with perfecting engagements and sessions. By this time I had defined a coaching engagement as having three goals, a set of strategies before one set of actions, and 12 sessions over three to six months. I had structured the coaching session as a one-hour dialogue, with various components that would create the right thinking environment, such as 'clearing the space', 'creating a context', 'relationship to the goals' and 'completion' (Rock, 2009a).

With all this worked out, there was another layer of thinking about coaching that I now wanted to focus on. I wanted to decode the pattern inside the best coaching conversations.

RESEARCH METHODS THREE: LIVE ACTIVITIES AND DATA COLLECTION

The way I decoded coaching conversations was by telling people about my own challenges, and then having them coach me. Most of what people did was ineffective and frustrating. I soon noticed the following list of distinct patterns in how people tried to coach me.

1. **They decided what my problem was and gave me advice about what I should do.** This was either directly or indirectly accomplished through loaded questions. Sometimes it was done in a polite and/or roundabout way. Sometimes it was more direct. Either way, it was frustrating when people tried to give me advice. They either asked questions I had thought of long ago, or had their own agenda about my solution. I found myself reacting in a visceral way. It felt like the coach trying to convince me, and me pushing back.
2. **They focused on my feelings and the problem, the way I did back in my teens as a counselor.** It was pleasant to have someone care about my problems,

but it didn't tend to change things. I would start to feel strong emotions about the problem and get emotionally engaged, which inhibited insight.

3. They tried a 'technique' on me that I didn't understand. Sometimes a coach used a technique that had an agenda, something they'd read in a book or learned in a class that just didn't feel right. My defenses went up when I didn't know where someone was going with a conversation, or was obviously trying to change me. It felt similar to being told what to do; only in this case it was being told how to think.

I mapped out these different patterns and the emotional dynamics in each situation, and pointed these out to others. We started to discuss in the workshops what an alternative path might look like.

I began conducting mini-experiments in groups within the coach training programs, and at monthly best-practice groups. These experiments were conducted for several years. A group of 24 people would be broken into six groups of four. In these groups, three people would try to coach one person on a real challenge. Then the coachee would give feedback about what worked, what didn't and why. Sometimes a person would have a breakthrough, and this provided enormous learning opportunities. I captured data regarding these events and found that before people were trained in coaching, around one in 20 conversations resulted in 'something useful', meaning that the coachee saw the situation differently and was over 75% likely to pursue a different action.

I discovered one big difference between coaching that worked and coaching that didn't: in effective coaching, it's the coachees who have the insights (Jung-Beeman, 2008), not the coach.

LEARNING JOURNEY SIX: A BIG INSIGHT ABOUT INSIGHT

Insights are easy to observe – they bring an obvious change in the coachee's demeanor. You can see or hear one from afar – a sudden burst of positive energy, a smile or a sudden movement, energized words and a new tone of voice. There's often a laugh, a sigh or a bursting of words. It's a release of energy.

This discovery changed my whole thinking about coaching. Coaching became about facilitating insight: without insight, coaching felt like 'nagging', 'encouraging' or

'demanding', none of which seemed to create much change. I started to go back to people the week after an insight in a coaching class, to see if real change had occurred. In the majority of cases, the insight had changed things – the coachee had taken real actions. I decided that insight was the 'active ingredient' in coaching and that coaches needed to focus more on it than they did.

There was another surprise: just two approaches made up most of the 19 out of 20 conversations that didn't work. These were the coach *thinking too much about the person's problem for them*, or the coach *focusing too much on the problem itself*.

I began to see that when coaching worked, it was because the coach had, usually accidentally, focused the coachee on their internal signals in a way that helped the coachee to get around an impasse (Rock, 2006, p. 105). The difference between this and what I had learned in my teens was that we were employing a solutions-focused approach: the insight wasn't about someone's nature, but about how to resolve an impasse in order to achieve a goal. The insights increased self-awareness, but it had to be a certain type of self-awareness that integrated with the coachee's own goals and resulted in action.

There was another big difference with what I had done when I was young using the common therapeutic approach: this was not an expert model. Normally when a therapist or counselor helps someone, they are considered the expert and are expected to ask questions to understand a person's situation and to apply guidance in some way. This whole 'expert' concept had to be put aside for coaching to work. This was a challenging concept for my mind and for others' minds when they first tried it, but after getting the idea, people found it to be liberating.

At the time I knew nothing about the neuroscience behind the technique. My interest in the brain was still personal. However, I understood the creative process and I saw the way people with breakthroughs were amazed at their new insights. It reminded me of the way I'd invented brand names in my advertising company: out of the blue when I was thinking at high level without concentrating too hard.

Through extensive observation, I began to identify the patterns that coaches followed when these insights occurred. I came to believe that insight occurred when a coachee didn't feel threatened, attacked, cajoled, or fearful and was able to think more clearly than usual. This happened when the coach:

- put aside their own answers and solutions to a coachee's problem entirely;
- inhibited themselves from asking questions that focused on any details about the problem;
- helped a coachee simplify their thinking;
- helped a coachee notice subtle, high-level patterns in their thinking and to see their own thought processes.

I started to teach these principles in a model I called the 'Five principles of Results Coaching', and published them in 'Quiet Leadership' (Rock, 2006). The five principles are: Self Directed, Solutions Focused, Positive Feedback, Stretch and Structure.

Several years into teaching these five principles I saw a subtle pattern emerge in the coaching process. I saw an 'operating system' at the heart of good coaching dialogues, which made insight most likely. It was a series of steps, which were as explicit to me as the steps in a change process, like the 'freeze, unfreeze, refreeze' model defined by Kurt Lewin (1975). My pattern involved establishing explicit permission to coach someone, then getting the coachee to feel safe, calm and focused by explaining what would be discussed, including the why and how. I would then ask a specific type of question that focused the coachee on the patterns in their thinking. I called these 'thinking questions'. Thinking questions enable people to see their own thinking, more clearly than they might otherwise be able (Rock, 2006).

I soon developed language for each step: Permission, Placement, Thinking Questions and Clarifying. These steps together became known as 'The Dance of Coaching', which changed to 'The Dance of Insight' when I published 'Quiet Leadership'.

When I first started teaching coaching in 1998, the training program had many different coaching tools. As I reworked this program over time, I became more fascinated by the mini-experiment showing that one in 20 conversations created change. I realized the goal of coaching was to create an insight in the coachee's mind, which then created change (Rock, 2006). There were specific steps (like quieting the mind and simplifying) that enabled insight, and other steps that inhibited insight (like getting too detailed or being problem focused). I noticed, to my surprise, how crucial it was that coaches made this shift away from details and problems, and how nearly everyone was inclined to do the wrong thing. I saw that unless coaches

could learn how to create the space for insight, their other coaching skills would be wasted. It was like teaching someone to drive a car. Without teaching them how to steer and break first, there's no point in teaching them how to park. I started to cut out certain activities from the trainings and focus more on different activities that ensured that behavioral change occurred in the coach, in order to enable them to bring about insight. I found it was difficult to change set behavior in a coach, and that coaches often needed a strong insight moment themselves to be willing to change.

This idea, that good coaching rested on just two skills that were counter-intuitive and hard to learn, was an unexpected and slightly frightening discovery. (To be fair, there were other ways coaches failed to bring people to insight, like insulting them subtly, or rushing them too quickly to actions, but these were less common). My approach was different compared to other coaching programs. An additional challenge was that the concept of not asking for details about peoples' problems made coaches or managers anxious; even experienced coaches resisted this idea. Letting go of the expert model was equally difficult (Rock, 2009b, pp. 210-211). This was even more challenging when teaching coaching in organizations: the hierarchical framework made it difficult for leaders to accept that they could be helpful without providing solutions to their employees.

At the time I didn't have the theoretical framework to explain how and why my approach built on client-driven insights was important. Later on, research on the brain states involved in insights revealed that insight requires a quiet mind and attention to one's subtle and quiet mental signals (Kounios et al, 2006).

Because my ideas about insight were challenging, I realized I needed to gather data and perform research to validate my approach. This realization started a long journey, which I am still on, involving testing the effectiveness of my approach, and attempting to understand the theories that support my observations. It was this drive to tie practice to theory that ultimately led me to build a theory for a wider range of mental experiences at work by drawing on neuroscience.

RESEARCH METHODS FOUR: TESTING A NEW COACHING APPROACH

To validate the importance of insight I began to do 'before and after' exercises in half-day or one-day workshops. Most of these were conducted as corporate workshops, which began in 2002. I started by asking everyone to write down a challenge they faced in one sentence in the form of the statement, 'I would really like

to... but...' I used this form to maintain some consistency in the methods. In the first round, before any training, people paired up randomly and chose one person to be the coach. The instruction was to take five minutes and to coach in any way. At the end of the five minutes, I asked the coachees, 'Who had an insight that has changed the way you see this situation, such that you are likely to take an action that would not have happened without this dialogue?' The highest numbers were around 40%, for trained coaches or people with good human skills such as human resources managers and corporate trainers. This was better than the 5% I achieved when I didn't give people the instruction to put their challenge in one sentence: this very act required people to simplify, focus and work out a central question, which can be a big step toward an answer. The lowest numbers were zero, which occurred from time to time. The numbers varied based on the type of group I was working with, but never went over 40%. On average people in organizations tended to have 10-20% of problems resolved within five minutes.

I would then train people in facilitating insights. This would take anywhere from two hours to two days, depending on how much time we had. Afterwards, I would ask people to go back to the same partner as before. They would redo the exercise, swap roles and use what I had taught about facilitating insight using Thinking Questions. I only twice found that the number didn't change, out of over 40 data sets. The highest percentage was 100%, which was achieved in about 20% of instances. The most common result was a 75% to 85% success rate. In summary, on average about one in five conversations were useful before training, and after training about four in five conversations brought insight and likely change.

This experiment was not controlled and had flaws: I worked with different sized groups, with different purposes, with different lengths of training. Yet it was obvious that the techniques were very effective. For example, one group went from 0% to 100% in one day of training. I even did this exercise in another language, with every word translated in both directions in Japanese and found similar results. I knew the approach worked, I just couldn't explain how or why.

The Dance of Insight model was (and still is) a central element of all RCS programs. I improved it in 2004, adding the following new layers of language.

- Listen for potential
- Speak with intent

- The clarity of distance
- Choose your focus
- The CREATE model
- The FEELING model

The Dance of Insight and the models above, and more, are taught in a foundational training program called the Intensive Coach Training (Rock, 2009a). In total, over 8,000 people went through this training from 1997 to 2010. This program was certified by the main coaching certification body, the International Coach Federation, as an 'Accredited Coach Training Program' (ACTP) in 2004. As of mid 2010 this program is now delivered in 39 cities in 24 countries. At the heart of this program, and all the coaching I teach, is the idea of bringing coachees to their own insights.

BOOK TWO: QUIET LEADERSHIP

Writing 'Quiet Leadership' (Rock, 2006) gave me the opportunity to formalize my discoveries about coaching conversations and make the ideas more widely available to others.

This book included the Dance of Insight model, The Feeling model, and other coaching patterns I had observed. The book pointed to a more effective way of 'getting from A to B', and outlined ways to help people get from impasse to insight to action. Drawing from my experience in marketing and communications, I worked hard to find the right language and 'packaging' for the ideas so that they would stick in peoples' minds and be easily shared. 'Quiet Leadership' (Rock, 2006) is now sold in seven languages including Chinese, Indonesian, Korean and Portuguese.

LEARNING JOURNEY SEVEN: WORKPLACE COACHING BEGINS

In 2001, RCS began receiving inquiries from corporations requesting us to work with their managers. The first was from a large government department in Australia (Rock, 2005b). Over several years we trained hundreds of internal coaches in the workplace modifying our public training programs to ensure their suitability for internal use. The modifications made to the public programs involved:

- reducing the size of the program on the assumption that we were dealing with well-educated people with good emotional intelligence. We decreased the program nearly 20% in size and found little observable impact on the learning, as evidenced by data collected and feedback from coachees (Rock, 2005; Rock, 2006b);

- changing the focus of the conversations away from situations irrelevant to work settings, like finding a job or working on a relationship. We shifted the focus primarily to work issues, but left several human issues like maintaining balance, wellness, confidence and quality of interactions intact. We also focused more on business goals and issues in training exercises.

By 2002, the importance of internal coaching had become apparent and competition in public training programs had increased. I created a brand, Workplace Coaching, to deliver coaching to organizations. By 2009, this area had slightly outgrown our public programs. Based on demand from customers we reduced the larger programs into units that could be delivered even more effectively to organizations. This meant building shorter programs that focused on everyday coaching skills, or feedback skills, without the 12-session coaching structure (Rock, 2006b). We worked with companies in financial services, retail, manufacturing, technology and the public sector and collected and summarized client feedback, which was on the whole was very positive (Rock, 2006c). While the programs clearly had an impact, as demonstrated in the business impact study on DB Breweries (Rose, Rule & Donde, 2007), the skills-based approach and lack of theoretical foundation inhibited our ability to attract larger projects. Universities were more successful than we were in this area.

LEARNING JOURNEY EIGHT: TEACHING AT NEW YORK UNIVERSITY

In 2004, spurred on by the idea of being more theoretically robust, I looked for ways to work with a university. On a regular visit to NYC, by chance I met a new manager at NYU (SCPS) and put forward a proposal to him to create a coaching certificate program based on my work. I was soon invited, along with coach Elizabeth Guilday, to create a curriculum, design training content and launch a program. I was now an adjunct lecturer at NYU.

In addition to my being an adjunct, RCS signed an agreement with the school to deliver coaching programs via their corporate division. It took over two years to get this deal confirmed. Our goal was to market coaching programs to US corporations, jointly delivered by NYU and RCS. During this time we developed a team of internal coaches at Memorial Sloan-Kettering, showing a 39:1 ROI (Rock & Rule, 2008). Another team was built at AIG Retirement Services, showing a 17:1 ROI (Rock & Rule, 2007) and a project with EDS became one of the largest coaching projects worldwide (Dempster & Moran, 2007; Moran, 2007).

Being at NYU was a highly productive time for me intellectually. Over several years, I enhanced my knowledge base with an understanding of the theory of coaching, knowledge about the brain and knowledge about bringing coaching into organizations. Partnering with a university provided many benefits.

RESEARCH METHOD FIVE: RESEARCH THROUGH TEACHING

The NYU certificate program started with a foundational course that included one-and-a-half days of coaching theory. I introduced some of my coaching models and created courseware on coaching theory, which involved a summary of the fields that coaching drew from, such as philosophy, humanistic psychology, solutions-focused therapy, change theory and systems theory. During each round of teaching, which involved from 30 to 70 students, Elizabeth Guilday and I, plus other faculty members, would take a fresh look at the coaching theory we planned to present to see how it could be improved. This process over many rounds of teaching enabled core concepts to emerge. We quickly reduced the focus on what appeared to be less relevant topics such as the history of psychology, key schools of psychological thought, research methods and personality issues.

What became pivotal in these theory classes was illustrating, and providing evidence for, the need to shift in two ways.

1. From a reductionist, clinical, pathological focus to a constructionist, solutions-focused approach.
2. From an advice-giving, expert model, to an insight-producing model.

We ended up with a core set of theoretical domains, including philosophy, cognitive psychology, positive psychology, systems theory, solutions-focused therapy, learning theory and change theory. There were many debates within the faculty about how to organize these fields and who were the central thinkers in each field. These arguments were often intense but useful.

Teaching a class in coaching theory taught me about other domains of knowledge. I also repackaged the theory coursework into a course I delivered within RCS, called the Theoretical Foundations of Coaching. This has become a 50-hour training program, run by RCS as an additional training program after the Intensive Coach Training (Rock, 2008).

THE EIGHTH LEVEL OF CIRCUIT DEVELOPMENT: LINKING TO OTHER DOMAINS OF KNOWLEDGE

While at NYU I decided to work on a coaching textbook as a means of refining my thinking about coaching theory. There was also a pragmatic reason for this: a book replaced the need to reproduce hundreds of pages of handouts for the participants in each program.

Writing this textbook made me think more widely about coaching and its links to other fields. My new discoveries pointed to the importance of neuroscience as an organizing bridge between an overwhelming number of models. At the same time, I was humbled to learn my thoughts about coaching were not as unique as I had once thought. I learned the importance of research and realized that I could no longer develop ideas in a vacuum, on a base of innocence, knowing how much research was out there. Fields like solutions-focused therapy (O'Connell, 2005) and gestalt therapy (Perls, Hefferline & Goodman, 1980) validated my approach and helped me see I was on the right track. I was especially excited to learn about Insight Theory from the Gestalt field, which validated my experiences with change (Köhler, 1929).

BOOK THREE: COACHING WITH THE BRAIN IN MIND (ROCK & PAGE, 2009)

Originally, I had intended the title for my new book to be 'Foundations of Coaching'. John Wiley & Sons agreed to publish it. I asked NYU students to help research different sections of the book to speed up the development process. As it happened, it was not published until 2009. Among the reasons for this were changes in the NYU relationship, which made the project less urgent plus the fact that I wanted to finish a popular book on the brain first. In 2008, Linda Page, a PhD running the Adler School of Professional Coaching, joined me as a collaborator on the book. I wrote 100,000 words, and Page added 50,000 more including additional references and links. In 2008, after I had established my thinking about brain-based coaching, we decided to call the book 'Coaching with the Brain in Mind' (Page & Rock, 2009).

LEARNING JOURNEY NINE: ORGANIZATIONAL APPLICATIONS OF COACHING

Another body of knowledge I built while at NYU centered on the organizational application of coaching. Initially I wanted to understand how other companies rolled out coaching initiatives and how this compared to what we were doing. I found there wasn't any meta research that linked different approaches together, but there were numerous case studies, return on investment studies and white papers. I soon became interested in measuring the impact of our own coaching programs, as well

as developing an understanding of the wider research on organizational coaching. I needed a catalyst to make this research happen.

From experience, I knew teaching would force me to learn. So, in 2005, I launched a three-day program at NYU called Coaching in the Workplace. I taught this three times at NYU, first at a five day then later a three-day class. I then built a set of slides and materials for other facilitators. The course is still offered and can be viewed online (NYU, 2009). I also repackaged the material for RCS to run for senior coaches.

Running the NYU 'Coaching in the Workplace' program prompted me to think about the concept of 'Coaching Culture'. I felt companies could benefit by thinking at a high-level about defining coaching culture, identifying the best strategies for building a coaching culture, and identifying measurement and management tools for the exercise. I decided to conduct research in this area since very little seemed to exist. This decision required consideration since I was venturing into a world that was new for me. However, I did see this as a way to take my business to the next level and decided to dive into it in a big way. I conducted workshops and presented keynotes on the topic of 'Building a Coaching Culture' at industry groups for corporate trainers and HR organizations.

RESEARCH METHODS SIX: ORGANIZATIONAL IMPACT AND ROI STUDIES

The concept of a coaching culture yielded a central question: what is the best strategy for implementing this culture? After reviewing dozens of case studies in the NYU class I began to see a pattern. There were four main approaches. At the base of a pyramid was organizational consulting, which involved a definition of coaching, determining coaching's fit and understanding its goals. Above this sat the piece used by most managers: leader as coach. Above that was internal coaching, which impacted fewer people but in a deeper way. Finally executive coaching, used minimally, was located at the top. For more on this, see *Driving Change with Internal Coaching Programs*, (Rock & Donde, 2008).

Around this time I became convinced that developing internal coaches was the only truly sustainable strategy to build coaching culture. To prove this to clients I needed data. Therefore, I needed to learn how to measure all types of coaching programs.

I then began to write commercially-focused white papers around this topic based on our own projects, beginning with 'Does Internal Coaching Work' (Rock, 2005) and 'Impact of Internal Coaching: What the Coachees Say' (Rock, 2006b). However, it was apparent that more than just having testimonials was needed. So, in 2005, I set out to collect more data.

The first iteration of data collection techniques involved 'self efficacy' surveys. I worked with my team to design questions for participants before and after training programs, which EDS executed and shared internally (EDS, 2006). We found that more data was needed, so I decided to shift my focus from asking participants about their changes to an investigation of feedback from their direct reports. We designed a new questionnaire and trialed it with both before-and-after data. Over time we determined the best time to collect data was immediately following an event which reflected a behavioral change. This single survey method seemed more accurate and a better reflection of the changes taking place. An example of the collected data appears in the overview of the 'Performance Leadership' program, an RCS training program that builds coaching skills for leaders (Rock & Rule, 2008, p. 2).

By 2006, we worked to measure every project in a number of ways. This included a formal return on investment study. For example, a breakdown of our approach to ROI is in the AIG case study (Rock & Rule, 2007). This was also written as a yet-to-be-published book chapter called 'Measuring the Effectiveness of Training Internal Coaches', American Insurance Group Retirement Services in collaboration with RCS.

During this time, I had learned how to conduct ROI studies by meeting with Jack Phillips (Phillips & Phillips, 2009) and Merrill Anderson (Anderson & Anderson, 2004), who had both written books on this subject. This is another example of my research technique where I directly approach other experts. In 2008, I was invited to present a paper at the Conference Board ROI Summit based on the ROI study we had completed for AIG (Rock & Rule, 2007). This study was selected as a case study in 'Best Practices in Measuring Coaching Programs' (Rock, 2008b).

I combined all the research from 2002 to 2008 into a one-day workshop on 'Building a Coaching Culture', which I have run several times for the Conference Board (Rock, 2008c). I also have a proposal in development for a book titled 'The Quiet Leadership Field Book', which will bring all this research together.

During this time I learned that it was possible to gather hard data about coaching and I developed techniques for accomplishing this. We produced two ROI studies, showing 17:1 and 39:1 return on investment. The client for the project that achieved 17:1 (Rock & Rule, 2007) had as a goal an ROI of only 150%. We had achieved more than ten times that. In spite of this, we received minimal additional work with that client after showing them the data. From this I learned that even having extremely impressive data was no guarantee that clients would continue to invest in coaching.

PAPER THREE: DRIVING CHANGE WITH INTERNAL COACHING PROGRAMS (ROCK & DONDE, 2008)

This paper was published in an Emerald Insights peer-reviewed journal and won a 'highly commended' award as one of the year's best papers. This paper synthesized insights gathered from the ROI and impact studies as well as general insights from conducting internal coaching programs.

An example of the scale of our internal coaching programs by this time is described in 'Coaching Leaders to Be Coaches at EDS' (Moran, 2007). In this project we trained over 100 internal coaches, who then coached over 400 executives across the organization each year. This kind of initiative appeared to be scalable, sustainable and capable of delivering high value for low cost.

Reviewing case studies of internal coaching, such as in the unpublished paper 'Does Internal Coaching Work' (Rock, 2005), and comparing them to external coaching cases, revealed that internal coaches could do the same job as external coaches but for dramatically less cost. People in large companies wanted coaches. In fact, a study by the Chartered Management Institute (2002) showed that, "93% of managers believe that coaching should be available to all employees, regardless of seniority." Training internal coaches could provide this.

This paper also highlighted how internal coaching could create a cascading effect capable of impacting more people than just the coachee. Training an internal coach could provide long-term organizational benefits. A study by Levinson, Newton & McDermott (2007) demonstrates the need for training in this area. It reported that, of 55 large organizations surveyed, "only 49 percent of their internal coaches have received any form of training, and 12 percent of internal coaches have earned any kind of certification."

All of this evidence confirmed my belief that developing internal coaches could be a powerful way to create a coaching culture, which could drive change in an organization. This was particularly evident in three areas: improving the process of on boarding new people, improving transitions and developing high potentials (Rock & Donde, 2008).

THE NINTH LEVEL OF CIRCUITRY DEVELOPMENT: CIRCUITS FOR THINKING ABOUT COACHING FROM THE PERSPECTIVE OF THE BRAIN (AND NOT PSYCHOLOGY)

Early during the development of 'Quiet Leadership' I became more curious about why the default approaches to helping were so automatic (e.g. giving advice and focusing on problems), why these approaches didn't work and why the models I taught worked so well. I also wanted to solidify the book's theoretical base. This was important given the counterintuitive nature of my insights.

I also wanted to include what I was learning from the NYU classes, and build a theory base for coaching that didn't necessarily reside in a school of psychology. There were several important reasons for this decision.

- 1.) The NYU program wasn't in the psychology school.
- 2.) I wasn't a formally trained psychologist.
- 3.) I felt that psychological models tended to be deficit-based. Positive psychology appeared to be, at the core, driven by clinical psychologists, working with clinical issues, using a more positive approach. I wanted to develop a theory for working with high-functioning people, not people with clinical issues, in a solution-focused way. After my experiences as a teenager, I may have been hyper-vigilant to deficit models.
- 4.) I felt it might be possible to forge a new path and create a new theory for coaching.
- 5.) I perceived that domains like systems theory, learning theory and change theory were just as important to coaching systems as psychology.
- 6.) The new field of coaching psychology was seeking to build a theory base and some of the key researchers in this field were actively attacking organizations like mine (Grant & O'Hara, 2006) that were not based in universities, primarily because we were not teaching coaches about clinical mental health issues.

I agreed that coaches should understand where and how to refer, and included this in my core coach-training program (Rock, 2009a, pp. 425-430) and in 'Coaching with

the Brain in Mind' (Rock & Page, 2009, pp. 316-320). However, I disagreed that coaches need tertiary-level training and solid grounding in clinical issues. As Grant and Cavanagh say (Grant & Cavanagh, 2007), there appears to be no real issue with psychologists making up just 5% of coaches (Grant & Zackon, 2004). Also, having personally trained hundreds of coaches, I find that many psychologists can be deficit thinkers, thus there is some unlearning required for them to coach effectively. After several rounds of teaching coaching at NYU, I began leaving out psychological theories, schools of thought and personality issues, as these things appeared to prime coaches to notice deficits rather than strengths. In summary, I was keen to build a theory-base for coaching and while I didn't know where it should fit, I knew a psychological framework would not be appropriate.

While teaching the foundational classes at NYU I had an epiphany. I was privately reading brain books and noticed statements relevant to coaching in John Ratey's 'User's Guide to the Brain' (Ratey, 2001).

I can still remember standing at the front of the room handing out two single pages of quotes. It was like giving half-asleep people a shot of adrenaline: the group of more than 70 students suddenly became engaged even though it was near the day's end. The impact of integrating brain research with coaching really stood out in this setting. People became more interested and engaged in understanding coaching.

Looking back, I now understand why bringing brain research into the class had such an impact. First understanding any new idea takes less effort when it can be pictured easily (Robertson, 2002). For example, explaining a complex concept like cognitive dissonance using a visual of two brain networks competing with each other is easier to 'see' than a conceptual description alone.

Also, neuroscience linked many of the other fields we studied. For example, studying the neuroscience of insight provides links between learning theory, change theory, solutions-focused therapy and positive psychology. Brain research can help people understand how other bodies of knowledge fit together. To me, this is a relief: without a common undergirding framework, holding ten disparate domains of knowledge together in mind is nearly impossible.

Also, physical descriptions open up more practical applications. For example, psychological studies show that happier people are more creative (Fredrickson,

2001). Neuroscience studies show that happier people are more creative *because* they are able to notice subtle brain signals more easily (Subramaniam et al, 2009). The neuroscience insight is more likely to have you undergo activities that result in insight, whereas the psychological path might instead encourage the creation of happy experiences, like playing table tennis, that do not really focus attention internally. The physical description is more granular, more detailed, about the actual functions involved in insight.

The enthusiasm of the NYU students for brain research led me to teach the next group more about the brain. Because of a long-term personal interest in the brain, I had plenty of resources and shared pages of quotes and research papers. Soon we included Ratey's 'A User's Guide to the Brain' as a required reading. The concept of 'Coaching with the Brain in Mind', of using brain research as a theoretical foundation for coaching, was born.

RESEARCH METHODS SEVEN: BUILDING A RESEARCH GROUP

I started an informal research group of 15 students from the NYU coaching certificate programs to further explore the brain-based approach and take advantage of the time I expected to spend at NYU. We met every few months for about a year and a half, sharing readings on neuroscience and debating ideas. We also explored how we might collaborate on a research study. I secured an in-principle matching grant from NYU to do a functional magnet resonance imaging (fMRI) study using NYU facilities. I met with NYU medical center's fMRI team to learn how it might be possible to study the moment someone had an insight during coaching. I also found an academic named Dr. Frank Mocsá, to help guide the research group. Mocsá attended many of our meetings and talked to our group regarding research approaches.

There was one big learning from this research group: if we were building a brain-based approach to coaching, then we were building a brain-based approach to insight because this appeared to be the observable, 'active ingredient' in coaching. This idea helped formulate my ideas for 'Quiet Leadership', giving me the confidence to include work on the neuroscience of insight.

NEUROSCIENCE MENTOR ONE: DR MARK JUNG-BEEMAN

To support my research and activities I started to correspond with and meet with neuroscientists. I had read a paper by Dr. Mark Jung-Beeman exploring the

neuroscience of insight (Kounios et al, 2006). Soon after, I met with him in Chicago to discuss his research. I also spent time with Jung-Beeman at the first and second NeuroLeadership Summits in 2007 and 2008 respectively and made several additional visits to meet with him. He continues to provide a positive influence on my thinking and I regularly communicate with him. My work with Jung-Beeman led me to Dr. Stellan Ohlsson who was working on insight from a different angle. His premise was to unblock impasses as a way to bring about insight (Knoblich, 1999). My interaction with both of these thinkers inspired me to focus on insight as the driver of change and gave me the courage to delve more deeply into neuroscience.

Based on my experience with the NYU coaching programs, and my meetings with these scientists, I decided to include a section in 'Quiet Leadership' that summarized brain research for coaches. This section was called '6 Insights About the Brain that Change Everything'. It took some courage to include this material as I wasn't a neuroscientist and could be open to attack. I wrote the section in simple terms, practicing the skill of translating the science using accurate metaphors. My future as a 'neurotransmitter' began to emerge.

NEUROSCIENTIST MENTOR TWO: DR JEFFREY M. SCHWARTZ

Neuroplasticity, the study of how the brain changes, is another area of brain research relevant to coaching (Schwartz & Begley, 2003). A book in this area that impacted my thinking was 'The Mind and The Brain' (Schwartz & Begley, 2003). In late 2005 I wrote to one of the authors, Dr. Jeffrey Schwartz, asking if I could quote him in 'Quiet Leadership'. We agreed to meet on my next visit to Los Angeles.

Schwartz was an expert in Obsessive Compulsive Disorder, and had helped cure patients by focusing on the creation of new pathways. This contrasted with other treatments that tried to understand the patient's problems. Schwartz was one of the first researchers to use brain imaging to show that short-term changes in attention spans can change brain circuitry (Schwartz, 1996). This was a breakthrough at the time, as neuroplasticity had only been thought to work at much longer time scales.

When we met and I explained to Schwartz what I had been doing in coaching, he felt we were doing similar work, namely facilitating self-directed neuroplasticity. I did this with high functioning people, while he worked in clinical situations. During this first meeting we agreed to find ways to collaborate and help each other: Schwartz would

help me understand the science, while I would help him make his ideas more relevant to the business world.

PAPER ONE: THE NEUROSCIENCE OF LEADERSHIP

Over the next year Schwartz and I spoke for many hours each month. We gave our first joint talk on Thursday September 15, 2005, at the Harvard Club in New York to executives from the America-Australia Association. In the crowd was Michael Rennie, a senior partner from McKinsey and Company, a large international consulting firm. Joe Bonito, a senior executive from Pfizer, also attended. This was our 'coming out' party, and the first talk that linked coaching, learning, leadership and change with neuroscience. At dinner with Michael Rennie that night, and breakfast with Joe Bonito the following week, I was told this path was urgent, important and timely. That encouragement helped me focus on writing a paper with Schwartz.

I approached Art Kleiner, the editor of strategy+business magazine, about publishing a paper, and despite having declined a similar idea I'd pitched a year earlier, he saw merit in a partnership between a neuroscientist and a consultant. Kleiner provided an angle for the paper. He reviewed my research regarding a neuroscience theory for coaching, and felt this was more relevant (and of interest to his readers) as a theory for leadership and change.

This was the first time I seriously considered the impact of my research on leadership development. My previous emphasis had been on coaching and I enjoyed my status as a big fish in this small pond. I was an expert in the coaching area, but had yet to acquire deep knowledge in the broader field of leadership theory. I was convinced there was value in coaching from a brain perspective: I was seeing benefits in the hundreds of coaches I had trained. They learned to coach faster and easier using neuroscience principles.

A new focus on leadership implied I would need to begin a new and larger learning journey, which from all appearances would be both challenging and exciting. However, I realized that coaching was central to leadership. My book 'Quiet Leadership' was already a step away from just coaching. Art Kleiner's hunch made sense, so I chose that direction.

The 'Neuroscience of Leadership' paper was written over 26 drafts between November 2005 and February 2006. I was the main author, but I checked my writing

with Schwartz before presenting it to Kleiner who edited it. During this time I read from ten to 30 scientific papers every week and read and marked up dozens of books. These included Joseph Ledoux's 'The Emotional Brain' (1998), Steven Pinker's 'How the Mind Works' (1999), Steffan Klein's 'The Science of Happiness' (Klein, 2006) and Robert Winston's 'The Human Mind' (Winston, 2004). In these books I noticed a lot of recurring themes, and felt there might be a way to organize neuroscience research into an accessible pedagogy for leadership, change and learning practitioners.

The paper was published in June 2006, just after the launch of 'Quiet Leadership'. This paper helped generate interest in the book and it soon became the most popular paper of the year, and one of strategy+business magazine's most popular ever. Based on this success, Schwartz and I decided to collaborate on a new book proposal to pitch to Harper Collins. The first proposal for what would become 'Your Brain at Work' (Rock, 2009b) was presented in October 2006.

When 'The Neuroscience of Leadership' paper came out, I gave talks both with Schwartz, and on my own, about the brain and leadership. Schwartz and I presented at MIT's Sloan Business School for a half a day in 2007. I also started speaking on this subject at industry events and gave keynote addresses at firms such as MasterCard and NASA. These talks helped shape my thinking about the importance and value of neuroscience in coaching and leadership development through feedback I got from participants. The paper and these talks steered me in a new direction. It became apparent that while coaching was important, a much wider field of change management, organizational development and leadership could benefit from neuroscience foundations. This was the fomenting stage of the NeuroLeadership field. The field didn't yet have a name and I couldn't describe what NeuroLeadership was, or wasn't, but I could sense something was emerging.

PAPER TWO: A BRAIN-BASED APPROACH TO COACHING (Rock & Schwartz, 2006b)

I wrote this paper (Rock & Schwartz, 2006b) to create a manifesto detailing a brain-based perspective on coaching. I included insights from Schwartz in an interview format and models about insight from 'Quiet Leadership'. I explored the need for a model that wasn't psychologically focused and presented insight as the central driver of change. The paper demonstrated that the time had come for a brain-based approach to coaching. It was peer reviewed and published in a journal soon after the 'strategy+business' article (Rock & Schwartz, 2006a). Although the

'strategy+business' paper had a far wider impact than a 'Brain Based Approach to Coaching', writing this second paper helped me complete a circle.

The big idea I wanted to get across in this paper was simple: there was value in thinking about coaching through the context of the brain. Not just because people like to know about the brain; but, because it opened up other insights about coaching, such as the strategies that would most likely result in increased numbers of insights (Kounios et al, 2006).

LEARNING JOURNEY TEN: ANOTHER RUN-IN WITH ACADEMIA THROWS UP A DETOUR

A session at the Gallup Positive Psychology Summit in October 2005 (Gallup, 2005) was one of the most controversial talks I have given. It was called *The Anatomy of an Aha: A New Approach to Facilitating Positive Change Based on Neuroscience and the Study of Insight*.

I was at this summit the year before and was introduced to new research relevant to coaching. People like Dr. Martin Seligman, Dr. Sonia Lyubomirsky, Dr. Barbara Frederickson and Dr. Jonathon Haidt were doing research that made the case for a positive, non-deficit, strengths- and solutions-focused approach to change. In my opinion something was missing. This research did not really explain *why* a positive approach worked, only *that* it worked. I wanted to go deeper, to get underneath the physiology and understand the *why*.

My session was controversial for several reasons. Firstly I presented Schwartz' work on how attention changes the brain. Several academics disagreed with the quantum-based explanation of attention (Rock & Schwartz, 2006) used at the session and I discovered later some of the organizers disagreed too. For a wider discussion of different opinions about how attention changes the brain, see 'Your Brain at Work' (Rock, 2009b, pp. 224-227).

The second controversy came from an exercise that focused on facilitating insight. I conducted an exercise with approximately 120 people put into pairs in the large hall at Gallup's headquarters in Washington DC. During this exercise, I asked each person to identify a challenge they were working on. Then one person tried to help the other solve their challenge, based on whatever techniques they currently used. I then outlined a theory for how insight worked, based on the 'four faces of insight' model in 'Quiet Leadership' (Rock, 2006, pp. 103-109) and provided example

Thinking Questions to prompt insight. People repeated the exercise. While the first exercise resulted in a handful of people having insights in four minutes, the second one resulted in over 60% of the pairs having an insight. In the first exercise, many people had tried to analyze the situation and apply positive psychology techniques. This was based on a therapeutic approach built on the expert model where the therapist is the expert. In the second instance, the participants simply facilitated their partner's insights without analyzing the situation themselves. This approach questioned basic assumptions of a positive psychological approach, especially when applied to coaching. It seems that the exercise had an impact, as I was politely asked not to speak at this conference again.

On the other hand, the exercise also excited many participants and I received significant positive feedback. I learned a lot from the positive psychology summits I did attend. However, I now see this learning was tangential to my main goals. I had already started to think of ways to organize different theoretical domains and illustrate their relative importance. By 2007, I had developed a complete theoretical framework for coaching. The metaphor we used was an oil well, with neuroscience as the main 'platform' (Rock & Page, 2009, p. 17). Undergirding the theoretical framework were the 'pillars' of positive psychology, systems theory, change theory and learning theory. There was a set of 'foundations' including ontology, philosophy, wellness, management theory and psychology. Dr. Linda Page added psychotherapy to this platform as we finished 'Coaching with the Brain in Mind' (Rock & Page, 2009). Page demonstrated that basic counseling skills were an important domain to include. My framework for coaching showed that positive psychology was important, but not as important as neuroscience, which sat at the apex of my model, would become. Neuroscience was the most direct interface between theory and practice, because it provided the most 'solid' and physical explanation of why coaching worked. The brain generally prefers physical to intangible because physical is more certain. Uncertainty often includes an element of threat (Hsu et al, 2005), whereas certainty by itself tends to feel rewarding (Bromberg-Martin & Hikosaka, 2009). The idea of certainty as a threat or reward is further stepped out in the SCARF model (Rock, 2008) and in 'Your Brain at Work' (Rock, 2009b).

For example, someone could say, *"Coaching exists because people benefit from improving self-awareness, and coaching improves self-awareness through dialogue."* Or, *"Coaching exists because people benefit from increasing the integration of their brain, and coaching helps people focus attention on creating new circuits that better*

integrate prefrontal and other regions of the brain.” These two things essentially communicate the same thing yet the latter statement is:

1. easier to picture mentally, which is how the brain learns easiest (Rock, 2009b, pp. 14);
2. as a result of point one, believed more readily and by more people;
3. more personal because it describes the actual physical experience of coaching, which is to focus attention;
4. easier to test, using brain imaging and other technologies (if not now then perhaps in the future).

These points help demonstrate that neuroscience is a useful theoretical tool for explaining how and why coaching works. In particular, neuroscience makes it easier to shift people from a clinical, deficit model to a constructive, solution-focused model. This is not an easy thing to do, and I believe it's one of the central changes people need to make to be effective coaches or change agents generally.

The Gallup conference also provoked a third controversy: my biography was misprinted in the program, which I only discovered on arrival at the event. The program listed me as a professor. I corrected this immediately on my nametag, and then during my first moments on stage. However, one of the coaching psychologists thought I had intentionally misrepresented myself, and wrote to NYU to complain. NYU formed a committee to investigate without telling or asking me anything.

The final controversy during the time of this summit occurred across the globe. I had sent a colleague from the NYU research group to deliver the same session I was presenting at Gallup at a Coaching Psychology conference in Sydney, which was occurring simultaneously. My colleague inadvertently represented the informal NYU research group in such a way as suggested that we were tenured staff rather than adjuncts. This made us the subject of an intense attack by academics, some of whom wrote to NYU to complain. Unfortunately a supportive Dean had left, and without consultation my adjunct lecturer status and commercial contracts were canceled. This destroyed three years' work and was a difficult time personally. After a few months, and much effort on my behalf, a letter was written to NYU by the university hosting the conference, clarifying that the situation had involved misunderstandings and that there were no intentional false claims. However, by then, the relationship with NYU was over.

NEUROSCIENCE MENTOR THREE: DR. YIYUAN TANG

A silver lining that emerged from this tumultuous time was meeting Dr Yiyuan Tang, a neuroscientist from China. He studied meditation, attention and related domains and had downloaded my paper from the conference which had ended the NYU alliance.

In December 2007, I went to China at Tang's invitation to collaborate on a research project based on what our NYU research group had studied. This new work intended to show the differences in brain activity when people focused on problems, were given a solution or were asked to find a solution for themselves. We set up an experiment at Tang's lab in China, and filmed a test run with 10 graduate students. The outcome has not yet been published. Tang continues his affiliation with the NeuroLeadership Institute and remains a valued mentor.

LEARNING JOURNEY ELEVEN: GOING ON FACULTY AT CIMBA

After the publication of the 'Neuroscience of Leadership' paper, I received many emails inviting collaborations. Due to time constraints I had to be selective in choosing which ones to pursue. A particular message that caught my attention came in August 2006 from the director of CIMBA, Dr. Al Ringleb (Ringleb, 2006). CIMBA is a study abroad university affiliated with many US universities and it specializes in transformational leadership programs. An aspect of Ringleb's plans excited me: he was working with young people. I had mixed emotions about the possibilities. I liked the idea of working with another university since I had learned so much at NYU. Yet with the NYU experience still fresh, connecting to academia again was not that appealing.

Ringleb explained on a long Skype call that he wanted to create leaders, not analysts. He felt that leaders needed strong self-awareness, like the circuits I had developed in my youth in a non-academic learning environment. However, teaching anything in a business school required a theory base, and other than psychology, none existed. Some business schools stayed away from psychology, partly because it was perceived as 'soft', and partly because psychology generally resided in another 'school'. Neuroscience provided an answer. Warren Bennis, in a paper in the Harvard Business Review entitled 'How Business Schools Lost their Way' seemed to think so too (Bennis and O'Toole, 2005).

LEARNING JOURNEY TWELVE: THE EMERGENCE OF NEUROLEADERSHIP

In October 2006 I went to CIMBA for the first time and was invited to be a regular lecturer in its MBA and undergraduate programs and to join its board of advisors.

I started to teach insights about the brain in a new format, tailored in a way that would allow yearlong MBA students to better understand themselves. I taught for a day and then gave them readings, which Ringleb integrated into the program. Each year I would deliver this lecture early in the year and after six months return to find what had stuck with them. Based on student feedback, the discoveries about their brains had a significant impact.

The NeuroLeadership field really emerged because of a convergence of interests between Ringleb and myself. We both wanted to build a new academic field outside of psychology. He had the academic credibility; I had the neuroscience language and contacts.

I was inspired by Ringleb's vision of providing better leadership development frameworks inside business schools. I had been guest lecturing at Gibbs University (South Africa), Victoria University (New Zealand), MIT Sloane Business School (USA) and the Singapore Institute of Management. At these events, people often remarked how little attention was paid to human skills in business schools. The idea of giving back to younger people was also appealing, as my own involvement in self-awareness programs had been a valuable part of my development.

As well as my collaboration with Ringleb, several other trends influenced me to establish a new field. Namely:

- adding neuroscience explanations to change initiatives was making change easier;
- the enthusiastic response to the 'Neuroscience of Leadership' paper;
- the HR, OD, Coaching and Leadership Development conferences I attended seemed stale;
- the encouragement of corporate executives who understood leadership development, like Jo Bonito from Pfizer and Michael Rennie from McKinsey;
- I was familiar with the neuroscience research that needed to be shared with change agents.

In summary, I could sense that value would be created if links existed between neuroscience and leadership, although at the time I didn't know what to call this new field. Building a new field could have been implemented in a variety of ways: I could have focused on a brain-based approach to coaching, the neuroscience of change or brain-based learning. The collaboration with Ringleb steered my attention toward the neuroscience of leadership.

LEARNING JOURNEY THIRTEEN: BIRTH OF THE NEUROLEADERSHIP SUMMIT

During a visit to CIMBA in late 2006 I suggested to Ringleb that a group of neuroscientists be gathered for a small brainstorming session. This was something I had proposed at NYU previously. To my surprise, Ringleb responded positively and we arranged a small summit for May of 2007. The idea was to run a public event to help offset the costs of getting the right scientists together. In working towards this summit, I coined the term 'NeuroLeadership' to mean the study of neuroscience of leadership, and called the summit 'The First Global NeuroLeadership Summit' (Rock, 2007).

The first NeuroLeadership Summit achieved its target of 50 participants. They came from eight countries, including CEOs, academics, senior internal learning professionals, consultants and coaches. Running this summit forced me to start thinking about the pedagogy of the neuroscience of leadership. Ringleb and I initially decided the field comprised three foci: self, social and systemic applications of brain research. By the following year this had changed to the four domains of NeuroLeadership, (Ringleb & Rock, 2008).

We covered what appeared to be foundational issues: sessions on attention, insight, expectations, social neuroscience and other fields (Rock, 2007).

Getting neuroscientists to talk to a general business audience was a new concept. I was worried whether the business audience would connect to the ideas and if the practitioners would argue with each other. These issues didn't materialize too much, but another unexpected challenge did: the venue was a 500-year-old converted church, and scientists were literally 'on a pedestal', inhibiting audience interaction. And, despite significant effort, no female neuroscientist presenters attended. In an audience that was largely female and accustomed to interaction, a sense of unease emerged. Many of them felt spoken to from up high, in a church, by older men.

Although the event was far from perfect, on the whole it felt like a success. Participant feedback was positive and over a third of the group returned for the following year's event. Many of the sessions were valuable, and all were filmed to become educational resources for later use. This summit facilitated my own education since I was forced to study and learn about new areas of neuroscience. Overall, I had achieved my goal of gathering an assortment of neuroscientists. Still, I had generated fewer interesting connections than I had expected, as some of the participating scientists tended to be a bit intellectually insular. In summary, the main outcomes from the first Summit were that I increased my ability to understand and explain neuroscience, I accessed new research and insights and I was forced to organize the ideas into a coherent model.

An unexpected benefit of the Summit was a spontaneous increase in interest in NeuroLeadership in the media. 'US BusinessWeek' did a feature (McGregor, 2007), as did 'CIO Magazine' (Koch, 2006), 'The Guardian' in the UK (Alden, 2007), 'BOSS Magazine' in Australia (Fox, 2007) and 'strategy+business' online (Rock & Schwartz, 2007). Soon after, the Society for Human Resource Management (SHRM) ran a cover story called 'The Brain at Work' featuring an interview with me (Fox, 2008). Other newspapers and magazines followed with reprints or edits of various stories online and in print. The term 'NeuroLeadership' had three links on Google in 2006, none of which related to the current field. By August 2009 there were over 28,100 links for the term (extracted from Google, 9 August 2009). The word was catching on. A field was being born.

Soon after the first Summit, Schwartz and I went back to work on the book we were collaborating on. We were originally going to write about the neuroscience of leadership, with a focus on facilitating self-directed neuroplasticity within organizations. We soon realized that a more fundamental book was needed first, to help individuals know their brain.

RESEARCH METHODS EIGHT: INTERVIEWING SCIENTISTS AND READING THEIR PAPERS

Between 2007 and 2009 I contacted nearly 50 scientists and interviewed 30. The publications authored by those not interviewed were studied and discussed with Schwartz. He often suggested subjects for my interviews based on specific topics developed for the book.

The interviews were valuable in two ways. First, I would ask a scientist what they were learning that might be applicable to leadership development, learning and change. I would then discuss their research. They would then point me to specific papers and suggest other relevant scientists. Usually I had read several of each scientist's papers and was able to ask questions about their research to help me understand connections between various fields. For example, when speaking to Dr. Amy Arnsten, who studied the prefrontal cortex and working memory, I would ask her how this work intersected with research on insight by Jung-Beeman. Through this process I discovered many links as well as disconnects. My findings went into 'Your Brain at Work' (Rock, 2009b).

The second benefit of conducting interviews was their function as a reality check. For example, I liked the idea of using a 'stage' metaphor in the book, and I asked several scientists for their thoughts and debated different metaphors that could be used. The key learning I got from these interviews was the ability to confidently make appropriate connections between theory and practice and therefore accurately shape the NeuroLeadership field.

I also validated my ideas by posing a question to each scientist: 'what impact has the research you have done had on your own life?' In most cases, I got excited responses back with real-life examples. In these cases I sensed the research would be relevant to everyday-life experience.

There were two people in particular whom I have maintained as key neuroscience mentors out of this process: Dr. Matthew Lieberman and Dr. Kevin Ochsner.

NEUROSCIENCE MENTOR FOUR: DR. MATTHEW LIEBERMAN

I first met Lieberman in 2007 while preparing for the first NeuroLeadership summit. His ideas seemed important, but he was unable to attend the event. Instead, I arranged to film him in Los Angeles. This was the first of many video interviews. I discovered it was useful to have videos to show in workshops. Lieberman pointed me to other important people I learned from including Dr. Amy Arnsten, Dr. Roy Baumeister and Dr. Naomi Eisenberger. I have met with Lieberman several times a year since 1997.

NEUROSCIENCE MENTOR FIVE: DR. KEVIN OCHSNER

Dr. Kevin Ochsner helped me understand subtle issues around emotional regulation and honed my critical thinking around neuroscience. He also connected me to Dr. James Gross, his mentor, whose reappraisal work had a big impact on my thinking. I have met with Ochsner at least once a year since 2006 and often check any new ideas with him.

BOOK 4: YOUR BRAIN AT WORK (Rock, 2009b)

One of the challenges of writing 'Your Brain at Work' with Schwartz was that I wanted the book to be an engaging, mainstream book. He only had written scientifically dense technical books. We argued about which metaphor was appropriate for everything. For the basal ganglia for example, it was anatomically correct to call it an automatic transmission system. However, peoples' experience informed them that this brain region was used for things done without conscious thought, a bit like an autopilot. One metaphor was accurate but did not help people understand the basal ganglia. An alternative metaphor was not as accurate, but made this region's function make sense. A tension emerged that was broken when Schwartz chose, for his own reasons, to pull out of the book partnership in 2008. The decision was made and settled amicably. I still felt confident about developing the book. He had provided good mentoring and introduced me to enough other scientists to continue my research. He had also gained from our partnership, including work with a business-consulting firm.

Writing this book forced me to think deeply about organizing the knowledge base for NeuroLeadership. My goal was to educate people at work about the brain and I wanted to make it as clear as possible. In the end, the structure of the book has influenced the structure of the NeuroLeadership field, with sections for decision-making, emotional regulation, collaboration and change. Finding this structure required going down several dead ends first.

The first dead end came when I was still using the book title 'Cool Under Pressure'. It had a series of brain challenges explained as stories of real people going through different situations. I interviewed people with interesting jobs. Examples included a ballet dancer and a rescue worker. After writing about 50,000 words I discarded the material.

Next, based on interest from the Harvard Business School Press, I repositioned the book as 'The Neuroscience of Business'. This draft was built around six brain issues, including how attention changes the brain. I related these issues to improving performance, engagement or culture. Then I was given feedback that the book should be structured for leaders so I rewrote the book again. This time it was built around topics like creating vision, developing strategy, connecting people and so forth. This version was called 'The Neuroscience of Leadership.'

Finally, by late 2007, I had a confirmed contract with Harper Collins, and based on their feedback, the book was further revised to focus on individuals, and was titled 'The Brain at Work'. The book now focused on brain-issues as the central theme.

In 2008 I decided the book could be improved with the inclusion of workplace challenges as an organizing principle. This would make it more compelling. During this time I continued to interview scientists and read their books and papers. Incorporating challenges like information overload and being overwhelmed by emails, I tried several versions of the book. One dead end of 20,000 words involved a husband and wife having a neuroscientist as their guest for a weekend. Another dead end involved using a neuroscientist as the narrator.

I wanted to make the book scientifically accurate, but also compelling to read, and nothing was working. The best way to make something compelling is with a story. But how could I tell a story about the most complex thing in the universe? At some point, going nearly crazy, I had an insight to write it as a story, following several characters. I first set the story over the time period of a week, but this was too complex. Then I tried a story of what happens in the brain during just one meeting. This approach could easily have filled a thousand pages or more, but it failed to offer any dramatic tension. I finally settled on the story of one day. Then I started outlining the challenges that I had researched, and how they would fit into a day. I had polled numerous people about their most difficult work challenges and chose 14 challenges based on this research. Then I realized there was one big topic that was hard to place - mindfulness. I needed to stop and start the story so I came up with the idea of structuring the book as a play, with an 'intermission'. Then I thought of the concept of introducing a 'director' into the story as the observer of mental process.

I finished the book early in 2009. It had been a long journey from 2004, when I had first noticed that knowing about the brain helped people become better coaches, to the present when I had finished a book that explained the brain for anyone with a job.

My drafts had been over 300,000 words, which were condensed to 92,000 words. I read over 300 papers, completed 30 real-time interviews with scientists, read numerous books and was involved in hundreds of hours of discussions with my scientific mentors.

PAPER FOUR: THE SCARF MODEL

While researching the 'Your Brain at Work' I found that many scientific studies drew a similar set of conclusions about the link between emotions and insight, and the importance of social issues to emotions, from different angles. For example, insight research said negative emotions inhibit insight (Jung-Beeman, 2007). Prefrontal cortex research showed that negative emotions created connection problems with circuits (Arnsten, 1998). Social neuroscience research showed that emotions reduced prefrontal functioning, but that the right type of prefrontal functioning decreased emotions (Ochsner, 2008b). Other social neuroscience research showed that fairness (Tabibnia, Sapute & Lieberman, 2008), social pain (Lieberman & Eisenberger, 2008) and loneliness (Cacioppo & Patrick, 2008) all activated negative emotions and produced a sense of threat. However, the research showed that these functions could also activate the reward circuitry of the brain. I wanted to find a way to put all the ideas that seemed to say the same things together into one model because it was such a central and important pattern to understand.

I viewed this model as having two parts. The first part was the approach/avoid response and the impact of this on perception and cognition. (I called this a toward-away response, because approach-avoid had the same first letter, making them harder to separate and remember).

The second part of the model explained the social domains that activated the toward/away response. I wanted an acronym that would be clear and memorable. Over 18 months I tried several versions, starting with CARS (Certainty, Autonomy, Relatedness, Status). I realized the 'fairness' element was missing. I eventually settled on SCARF for Status, Certainty, Autonomy, Relatedness and Fairness. (Rock, 2008).

The SCARF model described the social domains that were unconsciously driving human behavior. In 2008 I started to introduce this widely into my work at RCS. SCARF was first published in the 'NeuroLeadership Journal' (Rock, 2008d), then in 'strategy+business' magazine August 2009 (Rock, 2009c) and then in 'Your Brain at

Work' (Rock, 2009b). At the time of this submission, I am creating a 360-degree leadership evaluation and self-assessment based on the SCARF model.

LEARNING JOURNEY FOURTEEN: 2008 NEUROLEADERSHIP SUMMITS

In 2008, I decided to stage the NeuroLeadership Summits in Sydney (September) and NYC (October). I had learned that the Summit was priceless for understanding neuroscience, testing out ideas and receiving feedback. The Summit could in theory make a profit to fund research.

Lessons learned from the first event – too much time to the scientists and not enough time for integration – were incorporated into the Sydney summit, which had 110 participants. The event was further improved for NYC, which was held at the peak of the global financial crisis. This reduced final attendance to 150 participants from the projected target of 300. This meant we didn't have funding for research. In spite of this, I continued to conduct original research through Lieberman's lab, where I brainstormed various research projects with his students in late 2008. One of the NeuroLeadership Institute's continuing goals is to drive original research.

As stated earlier, running the summits forced me to organize the NeuroLeadership field. Initially I called this framework the five domains of interest and presented these at the Sydney Summit as:

- Know yourself
- Decision making and problem solving
- Emotional regulation
- Getting on with others
- Driving change

After feedback from the Sydney event, I modified this to:

- Decision making and problem solving
- Emotional regulation
- Collaborating with others
- Facilitating change

The 'know yourself' element focused on mindfulness research, and could be fitted within the 'emotional regulation' domain or sometimes within 'facilitating change'. The remaining areas are now known as 'the four domains of 'NeuroLeadership' (Ringleb & Rock, 2008)

Working out what to include and what to leave out at the NeuroLeadership Summits was complex. Many people wanted to speak, including consultants eager to build their profile. Lots of scientists could speak about their research, but were not effective with non-academics. We needed people who could speak well *and* who had important neuroscience research. In the end we focused the summits on the domains of interest, putting a keynote and practitioner session against each area and this seemed to work. We recorded all the sessions in Sydney and NYC to share the learning later.

LEARNING JOURNEY FIFTEEN: THE NEUROLEADERSHIP JOURNAL

Ringleb and I had talked about the need for a journal in 2006 when I first went to CIMBA, but by 2008 this seemed urgent if we wanted the field to be taken seriously.

Over several visits to CIMBA, I worked with new groups of students, and spent time in discussion with Ringleb about the journal. We wrote to scientists asking for papers and put out an official call to the NeuroLeadership database.

As it stands, the journal is divided into three sections: Research (original research and models), Case studies (illustrations of applications of NeuroLeadership approaches), and notes (discussions about the field). The first issue contained foundational research on all the four domains as follows:

- Decision making and problem solving: a paper on insight (Jung-Beeman, 2008)
- Emotional regulation: a paper on reappraisal (Ochsner, 2008)
- Collaboration: a paper on social neuroscience (Lieberman & Eisenberger, 2008) and SCARF (Rock, 2008)
- Facilitating change: two papers on mindfulness (Hassad, 2008) and (Tang & Posner, 2008)
- There was also a paper on validation of interventions (Gordon, 2008) and other discussion and case studies.

PAPER FIVE: THE EMERGING FIELD OF NEUROLEADERSHIP

Ringleb and I wrote a paper for the first journal outlining the NeuroLeadership field (Ringleb & Rock, 2008b). I wrote the first draft, focusing on the neuroscience literature, while Ringleb expanded this and added the business literature. We structured the field into the four domains (Ringleb & Rock, 2008, p. 5). This paper provided context for the development of the field, a history of the field and explored how to organize the field. It goes into detail on the ways that neuroscience can contribute to the existing business research literature within each of the four domains of NeuroLeadership.

LEARNING JOURNEY SIXTEEN: NEUROLEADERSHIP INSTITUTE AND RESEARCH

In 2008, Ringleb and I founded an institute to generate research and thinking about the field (Ringleb & Rock, 2008). By July 2009, there were over 200 paid members of the institute, with an opt-in mailing interest-list of 1,800. Members of the Institute connect quarterly by conference call to discuss research and applications of NeuroLeadership.

The Institute will use funds generated by educational activities such as its post-graduate certificate program and the summits to drive specific research. Examples of research topics (not a complete list) include:

Decision making and problem solving

- Testing of different techniques for decision-making
- Understanding the neural basis of peak decision-making ability
- Understanding the neural basis of insight
- The impact of explicit decision-making tools on team cognitive performance

Emotional regulation

- The impact of the threat and reward state on business decision processes
- The impact of mindfulness, labeling and reappraisal training on cognitive performance

Collaboration

- Deeper understanding of the impact of managing elements of the SCARF model on collaboration

- Testing of techniques for managing elements of SCARF to understand how to best increase employee engagement

Facilitating change

- The biological effect of creating corporate visions, strategic planning and other OD tools
- Research on how to generate optimum learning environments
- The effectiveness of different types of feedback techniques on performance
- The impact on the brain of various coaching interventions
- The impact of different types of leadership interventions on brain functioning
- The relative effectiveness of different types of leadership trainings
- The impact that knowledge of the brain has on overall performance

LEARNING JOURNEY SEVENTEEN: POST GRADUATE CERTIFICATE

Another development in NeuroLeadership is the launch of a Graduate Certificate program, which has been accredited in affiliation with Middlesex University and The Professional Development Foundation. In June 2009, I completed the outline of a one-year syllabus with the help of Neuroscientist Dr. Dan Radecki. This process took about three months of research and numerous meetings between Radecki and myself. (See Post Graduate Certificate Syllabus and Brochure in the appendices). The degree will be structured according to the four domains of NeuroLeadership (Ringleb & Rock, 2008). The first group of 36 students commenced in September 2009. In 2010 we are adding a master's degree.

All of the students are required to do a work-based learning project as part of their year of study. This research will provide new insights into how to apply neuroscience into change initiatives. We expect that some of the better studies will be published in the 'NeuroLeadership Journal'.

ARGUMENTS FOR AND AGAINST NEUROLEADERSHIP

With the launch of the NeuroLeadership Institute, Journal and Post-Graduate Certificate program, a conceptual foundation exists to think about leadership from a neuroscience perspective. NeuroLeadership is about the neuroscience of:

- Decision making and problem solving
- Regulating emotions

- Collaborating with others
- Facilitating change

Coaching is only one body of knowledge informed by NeuroLeadership. Other bodies include leadership development, learning, education, organizational development, change management and consulting.

Within each of the four domains are some surprises about the brain. Think of these as deficiencies that need to be addressed in order to be an effective leader or change agent. These deficiencies are items that all leadership programs are addressing. In 2009 there were 365,384 books with the word leadership in the title (based on a search on amazon.com, 13 August 2009). I propose that many of these books address just a small set of neural surprises. The NeuroLeadership field can help these books make more sense.

I have not yet undertaken a formal review of the literature to identify the exact set of neural surprises and this may be a future paper for the 'NeuroLeadership Journal'. However, six of the main issues I see being addressed by leadership and change programs are:

DECISION MAKING AND PROBLEM SOLVING

- 1. The limits of conscious decision making and problem solving*
- 2. The way insight requires inhibiting thinking about a problem*

REGULATING EMOTIONS

- 3. Negative emotions are more likely, more common, stronger and longer lasting than positive emotions*
- 4. Negative emotions reduce cognition, perception, creativity and collaboration*

COLLABORATING WITH OTHERS

- 5. The brain is more social than commonly realized. Social pains and pleasures are treated as if they were physical pains and pleasures by the brain.*

FACILITATING CHANGE

- 6. Attention changes the brain, yet attention too easily goes to the negative or what is known, over opportunity or what is unknown.*

These points are central themes in 'Your Brain at Work' (Rock, 2009b).

ARGUMENTS AGAINST THE FIELD

In the opening paper of the first journal, Ringleb and I explicitly outlined the value that neuroscience can add to leadership, exploring each of the four domains of NeuroLeadership in detail. In addition to this paper, there are further arguments both for and against the establishment of this field that I will explore here.

"It's not needed, this is only packaging."

Some people argue that the NeuroLeadership field provides nothing new, especially in some heated online discussions (Green, 2007), (BusinessWeek reader comments, 2007). The argument goes that all the models and tools we need can already be found within psychology, systems theory or other domains, and that NeuroLeadership only reframes or repackages these existing ideas. I counter this by asserting that reframing ideas to be more suitable or accessible to contemporary audiences has happened for centuries. I propose that this happens not because of lazy authors, but because it's needed: difficult ideas (such as learning to regulate one's emotions) are easier to digest when using familiar metaphors, and over time these metaphors change. We are now living in a deeply materialist era, where people trust physical science underpinned by hard evidence. Also, ideas need to be repackaged not just to help the publishing industry, but also to address challenges of the brain, such as the brain's inherent focus on problems instead of solutions.

Stating that the field is unnecessary because it is 'just packaging' is based on the idea that repackaging is negative and unnecessary. However, entire industries like packaging design exist because packaging persuades. Do we need to be more persuasive about the core ideas in NeuroLeadership such as improving self and social awareness? A study in 2008 found that 'improving leadership development' was the second most urgent issue for HR people, after talent management (Boston Consulting Group, 2008). Nearly two thirds of organizational change efforts fail, or at best deliver average results (Beer & Nohria, 2000). The evidence points to the need to do better at developing leaders and managers at all levels. If we assume that part of the problem is the need to increase neural integration so that leaders and managers are more adaptive, and that this process happens through 'self and social awareness', then I propose there is value in finding more persuasive methods of creating change in this way, such as contemporary metaphors, cognitive frames and language.

“There’s nothing new here.”

I propose that although NeuroLeadership does present similar ideas that exist in other fields it is not *just* repackaging. Thinking about mental experience from the context of the brain creates independent value in four specific ways. First, new delivery methods for coaching, learning and change interventions are being developed through brain insights. Second, totally new types of interventions are being created, and third there is the issue of validation of the efficacy of learning and change interventions, based on hard data from brain functioning, that does not rely on self-report. These three points are fleshed out in “*arguments for and against the field*” later in this document.

The fourth point relates to research methods that are producing surprises about the brain that we didn’t know before. These surprises can help create more effective interventions. Prior to neuroscience, most research involved asking people questions about their experience. However, as we stated in the introductory paper in the ‘NeuroLeadership Journal’, “*...the subject may not want to report their mental state, may not accurately remember what state they were in before the researcher asked, and, perhaps more importantly to the validity of the underlying experiment, simply reporting their mental state may change the subject’s current state or affect how the subject performs on the remainder of the experiment.*” (Ringleb & Rock, 2008, p. 5). There is also the fact that you cannot report on things outside your awareness. For example, you cannot determine that the degree of activation of the brain’s braking system is proportional to the degree of deactivation of the limbic system. On its own this finding is not a key point. However, another study (Lieberman, 2009) suggests that the brain’s braking system is used for all types of breaking – motor functions included. So now we have the possibility of improving a leader’s emotional regulation capacity through practicing physical activities that require physically ‘stopping’. It’s unlikely this could have been found without brain-imaging techniques.

“There’s not enough data on the brain yet.”

This is a fair statement and one could argue that brain research is indeed new and that there is still a huge amount to be explained. At the same time, there are over 50,000 neuroscientists in the world, and knowledge is being gained rapidly. According to ‘Nature Neuroscience’ magazine, “*It has now been more than two decades since the first fMRI paper was published. In 1992 just four such papers were published; in 2007 there were eight published per day.*” (Nature Neuroscience, 2009). With eight studies a day being published, we are able to make some basic

statements about the brain. For example, there is enough evidence to say that current ways of trying to bring people to insight are likely to be ineffective, whereas questions that enable people to notice subtle signals are more likely to work (Jung-Beeman, 2008). We also now have ways of testing the brain to validate interventions. These tests are thoroughly validated themselves (Gordon, 2008). Another example is the way suppressing the expression of emotions actually increases limbic system arousal, which inhibits clear thinking. (Ochsner, 2008b). Yet this is the strategy of choice for many leaders. This kind of research deserves to be shared, it would almost be wrong not to.

While there is much to learn about the brain, I argue that we already have important findings that can increase the effectiveness of interventions. Why should we not use these findings? Consider what Ochsner said when I asked him about the impact of his reappraisal research on his own life. *“If our emotional responses fundamentally flow out of interpretations, or appraisals, of the world, and we can change those appraisals, then we have to try and do so. And to not do so, at some level, is sort of irresponsible.”* (Ochsner, 2008b). To not share this research once you know it, at some level also feels irresponsible.

“We’re generalizing from the lab to the real world.”

This is perhaps the toughest argument to counter, as in some instances this can be true. One can take a lab finding too far and I think we will see a pushback soon from some scientists not wanting their research used by practitioners. Using experimental data obtained in controlled situations and saying this applies to a complex work situation can be dangerous at times. One problem with neuroscience is that, in some areas, you can indeed find studies to validate opposing views; therefore, one could argue that the research is being cherry picked to support an existing value system.

At the same time, many neuroscience studies have recently been replicated in social settings, specifically by the social cognitive neuroscience field (Ochsner & Lieberman, 2001). For example, Butler et al (2003) repeated Gross’ studies on emotional regulation showing that suppression increased limbic arousal, this time in real settings. It will be important for NeuroLeadership principles to focus on research that has come from real settings, not just MRI experiments.

Generalizing from individual settings to organizational insights is the bigger challenge. Here, the post-graduate education in NeuroLeadership will generate

research that develops theories, tests hypothesis and provides data about interventions that involve neuroscience and neuroscience principles. Each year we expect to see at least 50 such studies executed as part of the educational activities of the NeuroLeadership Institute.

There are also situations where laboratory research is providing hard data, rigorously tested, which is applicable to the real world. One example is the mybrainsolutions brain-training tool. Based on the world's biggest database of brain research, this system is able to assess an individual's brain functioning and then give that individual activities for improving specific skills, delivered online only (Gordon, 2008). This kind of NeuroLeadership research is highly applicable and scalable. It gives people the ability to understand and change their brain based on solid brain research.

“Anyone could call themselves a NeuroLeadership expert.”

This is currently true. However, I expect that NeuroLeadership practitioners will form a professional industry group in the future. There are already best-practice groups being set up worldwide by the NeuroLeadership Institute to facilitate sharing between practitioners. It will be important for the Institute to be involved in setting standards for people who want to publish research. A key point is that there is a certain level of theoretical understanding that is important if one is to educate others about brain research. At this point I see this level defined as a one-year post-graduate degree, currently being offered by the NeuroLeadership Institute. We expect that other educational bodies will in time deliver similar programs based on the syllabus we have developed.

ARGUMENTS FOR THE FIELD

Improving the effectiveness of existing leadership interventions

Improving leadership skills requires increasing neural integration. This is not an easy task: it involves people developing language for mental experiences. Being able to explain the underpinning biology behind leadership interventions can result in leaders being more open to developing new skills, because the metaphor of the brain is a more acceptable and 'safe' language for most leaders. This is important when you consider that leaders, through overuse of their cognitive skills, may have become less functional in their self and social circuits and that having to develop these skills may look uncertain and therefore threatening (Rock, 2009b, p. 235). Therefore, using the brain as the metaphor could improve the effectiveness of leadership interventions

simply by reducing the inherent threat in that intervention. Increasing certainty tends to reduce threat (Rock, 2008d).

The language of NeuroLeadership can make a leadership idea clearer and therefore more certain in several ways. The idea can become better defined and more in line with a leader's personal experience of the mental world. Consider the four examples of existing language below compared to their NeuroLeadership counterparts.

<u>Existing language</u>	<u>NeuroLeadership language</u>
Self-awareness	Neural integration
Stress	Threat response
Self-esteem	Status
Trust	Relatedness

While a change to NeuroLeadership language may not seem substantial, consider these points:

Self-awareness can only be measured subjectively, through answering questions, which produces questionable data. Neural integration can be directly measured, producing hard data, showing people how they improve over time as they practice new techniques (Gordon, 2008). Self-awareness can sound personal: leaders tend to have reduced self-awareness as a result of spending a lot of time using cognitive skills (Rock, 2009b, p. 235). Thus the concept of self-awareness can sound threatening. Neural integration appears more biological, which people with strong cognitive skills may feel more comfortable with.

Stress can't be measured directly, again without self-report. With *threat response* as a frame, you can identify people's automatic, unconscious bias toward positive versus negative situations and then make changes to this bias with specific mental exercises (Gordon, 2008).

The concept of *status* may be a more accurate understanding of the concept of *self-esteem*, because self-esteem appears to be linked to how we feel compared to others (Rock, 2009b, p. 187). A rise or drop in perceived status tends to create a threat response, which explains the real difficulty behind giving feedback and performance reviews. It can be helpful to know that even moderate changes in status

can create strong (and therefore cognitively debilitating) threats in people who would normally be perceived as having high self-esteem.

The concept of *trust* is soft and consequently hard to measure. Or one can think of this as 'relatedness'; as a biological response to thinking someone is related to you, a friend, or not related to you and therefore a foe. This friend or foe response can be explained with evolutionary psychology (Rock, 2009b, pp. 161-163), making it more evidence-based than a soft concept of trust. There is biological functioning that can explain the friend or foe construct, such as the automatic foe-response (Rock, 2009b, p. 165), again making the whole construct of trust more certain.

Now consider putting these ideas together within a leadership intervention. Imagine trying to help leaders be more authentic, something proposed as important for leading others (George, 2004). You could talk about the need for trust, and present psychological research on trust. Or you could explain the need for authenticity to leaders this way: that people automatically feel threatened by someone of higher status, and that this threat decreases peoples' mental performance, thereby reducing their neural integration so that they become more automatic and less reflective. You could then go on to explain that a way to reverse this effect is to connect on a human level, which activates an oxytocin response, which reduces the threat response. Whereas the psychological explanation is more general and less 'concrete', the neuroscience explanation can be broken down and has physical explanations and research validation at each level of detail. Given that talking about being more authentic can appear as a threat to a leader, anything that can make the idea of authenticity seem more certain can make it less threatening.

There is a wider set of language for human experiences based on the brain in the glossary of terms in 'Your Brain at Work' (Rock, 2009b, pp. 273 -277).

Creating different delivery methods

Using brain research can help redesign the methods of change interventions. Many training programs, based on the one- or two-day training model, are highly inefficient given the brain's limited capacity to learn, and the requirement for embedding before layering on new skills. For example, a study by Zenger & Folkman (2005) found that the follow-up stage of a learning intervention accounted for 50% of behavior change. Brain research is pointing to a better way of facilitating learning, which involves small, regular efforts to focus attention (Rock, 2009b, pp. 233-235). In my work with EDS,

we delivered a learning intervention to 3,000 leaders, in small groups, completely by telephone over six weeks. Standard thinking is this wouldn't work. Yet data from EDS' own studies, based on a random survey of 150 participants across 35 groups, showed that only 9.3% of participants thought telecall training didn't work for them (Dempster & Moran 2007) & (Moran, 2007). Understanding the brain enabled me to redesign a training program based on short, intense bursts of learning (because of small working memory), in a social environment (because the brain pays attention to the social world). It was equivalent to around a three-day in-person training intervention, and no one had to travel. This breakthrough emerges from applying brain insights to learning interventions.

Creating new types of interventions

Brain research is providing fresh insights about maximizing attention (Rock & Schwartz, 2006), managing expectations (Coghill, McHaffie & Yen, Y. 2003), increasing innovation (Jung-Beeman, 2008), regulating emotions (Ochsner, 2008b) and many other leadership skills. Within the research are discoveries about the brain that open up new types of interventions. For example, a study showed that just 100 minutes of mindfulness training in a week created a 30-50% reduction in cortisol levels, a marker of stress, against a control group (Tang & Posner, 2008). Before this study, it was generally understood that the benefits from mindfulness took significantly longer. As another example, research on the social brain points to the real pain of social threat (Lieberman & Eisenberger, 2008), which points to the central driver of why performance reviews are often ineffective, and how we could improve their effectiveness (Rock, 2009b, p. 215).

Validation and improvement of leadership, learning and change interventions

There are now brain tests that can test the effectiveness of various initiatives (Gordon, 2008). This is an opportunity to find out what works, do less of what doesn't and identify best practice. While this is new, we see this as a big growth area for NeuroLeadership research.

THE IMPACT OF WRITING THIS SUBMISSION

The process of writing this submission over 12 months has been more interesting and more useful than I had expected. It has enabled me to:

- Layout the temporal journey I have been on, which helps me, perhaps, anticipate where I might be going. I can see now that there is a lot more to do and that this is just the beginning of a huge amount of further research.
- Recognize my mistakes at different points, like the side tracks of positive psychology, which makes me more aware of being cautious about my focus.
- Be more aware of the influences of various events and people, such as the impact of my painful interactions with academia. It is important I don't let events like these determine my future. My purely instinctive reaction is to stay away from academia entirely. My evidence for not doing so is this submission.
- Identify the turning points in my thinking, such as the event with Schwartz in NYC when we first spoke about leadership and the brain, and when I realized more deeply than before that something big was emerging.
- Identify the overall theme that I have been, unconsciously until now, working to build. That theme can be summed up in the idea of becoming 'addicted' to increasing neural integration in myself and others at an early age, and then finding ways to do this in the world at higher and higher levels of impact, from a science-based perspective.
- Identify my research methods. This has helped me be more self-critical going forward about my own approach to building knowledge. I can see I am becoming more integrative in my thinking, increasing the amount that I build on existing knowledge.
- See the evolution of my thinking overall, which has helped me maintain more of a third-person, and therefore more critical, perspective on my research. I know now that I could look back in another decade and attack my present work, and this perspective helps me focus on questioning my actions with the long term in mind.

WHERE THE NEUROLEADERSHIP FIELD IS HEADING

The first few years of the NeuroLeadership field established the optimum framework for organizing the field, the key researchers and areas of focus, and a series of papers building the field conceptually. The next steps for the field involve sponsoring and supporting an active research agenda.

Research agenda

The Institute will be funding studies to identify further insights, specifically studies that link neuroscience directly with leadership initiatives and studies involving people in the workplace. There will be funds available for this in 2010, growing in 2011 and beyond. An example of this kind of study can be found in the paper 'The Neuroscience of Engagement' published in the 2nd edition of the 'NeuroLeadership Journal' (Rock & Tang, 2009), which illustrates ways of measuring engagement using biological markers such as cortisol.

With the launch of post-graduate courses in late 2009, there is now a body of students who will be undertaking work-based research studies. As of March 2010 there are 80 studies underway, with an additional 100 or more expected each year. An ongoing engine of research has been created to further build this field, which is far beyond what is possible with any single individual's contribution.

Impact on business schools

The NeuroLeadership field is providing a framework for business schools to begin to include more neuroscience knowledge and learning experiences, which can improve the quality of future leaders graduating. This idea is fleshed out in 'The CIMBA MBA Leadership Program' (Ringleb & Pagone, 2009) in the 2nd edition of the 'NeuroLeadership Journal'. I see a time when most business schools will be teaching future leaders about decision making, self regulation, collaboration and human change from the context of brain functioning.

Impact on change management

The human ability to create positive change of any type has a poor track record. I propose that this is partly because our understanding of change has been incorrect. We believe that people change if given information, or told of consequences, yet this often doesn't produce required changes (Rock & Schwartz, 2006). Change it turns out may be harder than has been acknowledged. Neuroscience research is beginning to point to the active ingredients in change processes, which appear to be the creation of new neural circuits for all participants. These occur when people pay attention, which happens when risk and threat, especially threats that activate SCARF reactions (Rock, 2008d) are reduced. The NeuroLeadership field has the potential of improving the effectiveness of positive change interventions by improving our understanding of the mechanics of change, enabling us to move from a descriptive to an active model of change.

Impact on coaching

The NeuroLeadership field will continue to have an impact on the field of coaching. Coaches who are learning about the brain find that they are more effective at engaging clients in change. (This has been discussed at the NeuroLeadership Summits but has not yet been formally studied). I propose that clients who understand the brain develop better self-regulation capacity: their 'braking system' is improved (Lieberman, 2009) because they are able to label a wider range of mental experiences as they occur.

The long-term goal: improving the neural integration of leaders globally

One of the big goals for the field is to literally improve the quality of leadership, globally. I believe that the inclusion of brain-based insights in leadership programs, (in business schools, in-house programs and in commercial leadership training programs), enables the creation of more integrated and adaptive leaders. Leaders with a better understanding of the brain make better decisions for themselves and for others. Ultimately this happens because of improved self-awareness and self-regulation capacity of future leaders, which is generated through more accurate theories about human functioning

SUMMARY OF MY LEARNING JOURNEY

Looking back over 12 years of research and development of ideas around human performance, I can see that my work has impacted on the wider knowledge base in several ways.

Firstly, within the coaching field, I established an approach to coaching that is highly effective at bringing people to insights. This approach proved suitable to organizational settings, and this enabled coaching to be brought into organizations in a wider and more systematic way. Over 10,000 people learned to become more effective coaches through my techniques, and many more through my published works.

Secondly, in the search to understand coaching, I developed a framework called NeuroLeadership. My impact here has included developing the pedagogy of this field, bringing researchers together to discuss the field, establishing a journal, and establishing academic educational programs that will drive work-based research. This field has the capacity to improve organizational change initiatives through better understanding of how change occurs, new types of interventions and better

measurement of interventions. We expect that by the end of 2010, there will be over 100 practitioners conducting work-based research around the field of NeuroLeadership. While there is a lot of research yet to do, my work has helped define and shape this new field.

In some ways this submission could suggest that building the NeuroLeadership field occurred through a series of coincidences and opportunities. This may be true in part. However, I propose that if I had not developed this idea someone else would have. In other words, a progression toward this concept was inevitable. Others have been exploring how neuroscience underpins leadership, (Bennis & O'Toole, 2005). I was among the first to formalize the discussion. I believe that had I not developed the concept of NeuroLeadership, I would have created an alternative explanation to describe my observations of the neurological processes taking place inside coaching conversations. An alternative idea based on change management or systems theory may have emerged. In either case, my desire to understand human functioning required the development of a research framework.

I see a time when NeuroLeadership will become a widely accepted field of study, taught as part of leadership programs at universities worldwide. I believe it will become a complete degree taught at university, from undergraduate to masters and doctoral levels. I can see a future where leadership, learning and change programs draw on NeuroLeadership papers and educational tools to improve the effectiveness of interventions. I can see brain-based tools being used to validate and improve interventions. All these things are possible if the development of the field is well managed and good research is done.

My own journey has come full circle from discovering my own mind and brain in my youth, to building a school of thought in coaching, to helping others understand their own minds and brains on a large scale with books, summits and educational programs. Here is a summary of the eight big steps in this journey, focused on the key developments. The items in italics are papers, books, courses or publications I produced, with the approximate dates when I was most focused on each issue:

1. One-to-one coaching: *Coaching engagement model* (1997)
2. Coach training: *Intensive Coach Training program, Personal Best* (1999)
3. Active elements in coaching: *The Dance of Insight* (2000)
4. The importance of insights: *Quiet Leadership* (2003)

5. The neuroscience of insight: *Brain-based approach to coaching* (2005)
6. Brain-based coaching: *Coaching with the Brain in Mind* (2006)
7. The neuroscience of leadership: *strategy+business first paper* (2006)
8. Development of the NeuroLeadership field: *Summits, Institute, Your Brain at Work, Journal, four papers in journal, strategy+business second paper, The Post-Graduate Certificate in the Neuroscience of Leadership* (2006 – onward)

I am grateful to the many mentors and collaborators who supported and assisted me on this journey, without whom all of this may never have happened.

In 2009, at age 41 and after 26 years of thinking about human experience, I believe that the most effective brain is an integrated brain. One way of integrating your brain is by understanding your brain through having neurological language for mental experience. As you develop language for experiences, your prefrontal cortex can manage these experiences better.

There are many ways to increase neural integration: narratives, the arts and humanities, reflection and spirituality to name a few. In our secular, science-obsessed world, using language that feels safe enables people to notice things about their brain, rather than feel threatened by the message.

My hope is that this work around translating, connecting and ‘packaging’ complex neuroscience may help more people learn about themselves and develop greater neural integration. With greater neural integration increased choices and a greater capacity to achieve one’s goals is possible, as well as greater understanding and empathy toward others and an ability to think more systemically about the wider world. In this way, increasing neural integration can be seen as a step toward creating a fairer and more sustainable world.

REFERENCES

- Alden, C. (2007) All in the Mind. *The Guardian*, September 15, 2007, HR Focus, p. 2.
- Anderson, D. & Anderson, M. (2004) *Coaching that Counts: Harnessing the Power of Leadership Coaching to Deliver Strategic Value*. London, Butterworth-Heinemann.
- Arnsten, A. F. T. (1998) The Biology of Being Frazzled. *Science*, Volume 280, pp. 1711–1712.
- Barnes, S. Brown, K. W., Krusemark, E., Campbell, K. W., & Rogge, R. D. (2007) The role of mindfulness in romantic relationship satisfaction and responses to relationship stress. *Journal of Marital and Family Therapy*, Volume 33(4), pp. 482–500.
- Baron-Cohen, S. (1997) *Mindblindness: An Essay on Autism and Theory of Mind*. Cambridge, MIT Press.
- Beer, M., & Nohria, N. (2000) Cracking the Code of Change. *The Harvard Business Review*, 78(3), pp. 133-144.
- Bennis, W., & O'Toole, J. (2005) How business schools lost their way. *The Harvard Business Review*, 83(5), pp. 96-104.
- Block-Lerner, J., Adair, C., Plumb, J. C., Rhatigan, D. L., Orsillo, S. M. (2007) The case for mindfulness based approaches in the cultivation of empathy: does non-judgmental, present moment awareness increase capacity for perspective taking and empathic concern? *Journal of Marital and Family Therapy*, Volume 33, Issue 4, pp. 501-516.
- Boston Consulting Group (2008) *Creating people advantage: how to address HR challenges worldwide through 2015*. Boston, Boston Consulting Group.
- Brefczynski-Lewis, J. A., Lutz, A., Schaefer, H. S., Levinson, D. B. & Davidson R. J. (2003) Neural correlates of attentional expertise in long-term meditation practitioners. *Proceedings of the National Academy of Sciences of the U.S.A.*, Volume 104(27), pp. 11483–11488.

Bromberg-Martin, E. & Hikosaka, O. (2009) Midbrain Dopamine Neurons Signal Preference for Advance Information about Upcoming Rewards. *Neuron*, Volume 63, Issue 1, 119-126.

Brown, K. W., & Ryan, R. M. (2003) The Benefits of Being Present: Mindfulness and Its Role in Psychological Well-Being. *Journal of Personality and Social Psychology*, Volume 84(4), pp. 822– 848.

Butler, E. A., Egloff, B., Wilhelm, F. H., Smith, N. C., Erickson, E. A., & Gross, J. J. (2003) The social consequences of expressive suppression. *Annual Review of Psychology*, 57, 3(1), pp. 48-67.

Cacioppo, J. T., & Patrick, B. (2008) *Loneliness: human nature and the need for social connection*. New York: W. W. Norton and Company.

Chartered Management Institute (2002) *Coaching at Work Survey*. London, Campaign for Learning and Chartered Management Institute.

Coghill, R.C., McHaffie, J.G., Yen, Y. (2003) Neural correlates of inter-individual differences in the subjective experience of pain. *Proceedings of the National Academy of Sciences*, U.S.A., Volume 100, pp. 8538-8542.

Creswell, J. D., Way, B. M., Eisenberger, N. I., & Lieberman, M. D. (2007) Neural correlates of dispositional mindfulness during affect labeling. *Psychosomatic Medicine*, Volume 69, pp. 560-565.

Davidson, R., Putnam, K.M., & Larson, C. L. (2000) Dysfunction in the Neural Circuitry of Emotion Regulation-A Possible Prelude to Violence. *Science*, 28 Vol. 289. no. 5479, pp. 591-594.

De Botton, A. (2004) *Status Anxiety*. New York, Pantheon.

Dempster, C. & Moran, J. (2007) *EDS Case Study*. Presented at Conference Board Executive Coaching Summit, New York City, January 2007.

Druskat, V. U., Sala, F., & Mount, G. (Eds) (2005) *Linking Emotional Intelligence and Performance at Work, Current Research Evidence With Individuals and Groups*. London, Psychology Press.

EDS (2006) *EDS first study on coaching skills*. Internal document published by EDS. Plano, EDS.

Farb, N. A. S., Segal, Z. V., Mayberg, H., Bean, J., McKeon, D., Fatima, Z., & Anderson, A. K. (2007) *Attending to the present: mindfulness meditation reveals distinct neural modes of self-reference*. *Social Cognitive Affective Neuroscience*, Volume 2, pp. 313-322.

Fisher, W.R. (1987) *Human communication as a narration: Toward a philosophy of reason, value, and action*. Columbia, SC, University of South Carolina Press.

Fox, A. (2008) The brain at work. *SHRM magazine*, Volume 52, no. 3, March 2008.

Fox, C. (2007) It's all in the mind. *AFR Boss Magazine*, Sydney, Fairfax Media, pp. 24-28.

Fredrickson, B. L. (2001) The role of positive emotions in positive psychology: the broaden-and-build theory of positive emotions. *American Psychologist*, 56, pp. 218-226.

Gallup (N.D.) *Employee Engagement* [Internet], Washington. D. C., Gallup. Available from: <<http://www.gallup.com/consulting/52/Employee-Engagement.aspx>> [Accessed 13 August 2009].

Gallup (2005) *International Positive Psychology Summit Agenda 2005* [Internet], Washington, D. C., Gallup. Available from: <<http://www.gallup.com/consulting/wellbeing/118111/international-positive-psychology-summit-agenda-2005.aspx>> [Accessed 13 August 2009].

George, B. (2004) *Authentic Leadership: rediscovering the Secrets to Creating Lasting Value*. Hoboken, Jossey-Bass.

Goldberg, E. (2009) *The New Executive Brain: Frontal Lobes in a Complex World*. New York, Oxford University USA.

Gordon, E. (2008) NeuroLeadership and Integrative Neuroscience: "It's about validation stupid!" *NeuroLeadership Journal*, edition one, pp. 71-80.

Grant, A.M., & Cavanagh, M.J. (2007) Coaching psychology: How did we get here and where are we going? *InPsych*, 29(3), pp. 6-9.

Grant, A. M., & O'Hara, B. (2006) The self-presentation of commercial Australian life coaching schools: cause for concern? *International Coaching Psychology Review*, 1(2), pp. 20-32.

Grant, A.M. & Zackon, R. (2004) Executive, workplace and life coaching: findings from a large-scale survey of international coach federation members. *International Journal of Evidenced-Based Coaching and Mentoring*, Volume 2, no. 2.

Green, C.H. (2007) *Is NeuroLeadership More Than Reinventing Wheels?* [Internet], West Orange, N.J., Trusted Advisor Associates. Available from:
<<http://trustedadvisor.com/trustmatters/184/Is-Neuroleadership-More-Than-Reinventing-Wheels>> [Accessed 13 August 2009].

Guterman, J. T. (1994) A social constructionist position for mental health counseling. *Journal of Mental Health Counseling*, 16, pp. 226-244.

Harmon-Jones, E. & Winkielman, P. (2007) *Social Neuroscience: Integrating Biological and Psychological Explanations of Social Behavior*. New York, Guildford Press.

Hassad, C. (2008) Mindfulness, wellbeing and performance. *NeuroLeadership Journal*, edition one, pp. 53-60.

Heath, C., and Heath, D. (2007) *Made to Stick: Why Some Ideas Survive and Others Die*. New York, Random House.

Heifetz, R. A., Linsky, M. & Grashow, A. (2009) *The practice of adaptive leadership*. Boston, Harvard Business School Press.

Hsu, M., Bhatt, M., Adolphs, R., Tranel, D., & Camerer, C. F. (2005) Neural Systems Responding to Degrees of Uncertainty in Human Decision-Making. *Science*, Volume 310, pp. 1681-1683.

Jung-Beeman, M., Collier, A., & Kounios, J. (2008) How insight happens: learning from the brain. *NeuroLeadership Journal*, edition one, pp. 20-25.

Kabat-Zinn, J. (2008) *Clinical Handbook of Mindfulness*, Didonna, F. (Ed). London, Springer.

Klein, S., (2006) *The Science of Happiness: How Our Brains Make Us Happy-and What We Can Do to Get Happier*. Cambridge, Ma., Da Capo Press.

Kleiner, A. (2008) *The Age of Heretics: A History of the Radical Thinkers Who Reinvented Corporate Management*. Hoboken, Jossey-Bass.

Knoblich, G., Ohlsson, S., Haider, H., & Rhenius, D. (1999) Constraint relaxation and chunk decomposition in insight problem solving. *Journal of experiment psychology. Learning, Memory and Cognition*, Volume 25(6), pp. 1534-1555.

Köhler, W. (1929) *Gestalt psychology*. New York, Liveright.

Koch, C. (2006) The new science of change. *CIO Magazine*, September.

Kotter, J.P. (1996) *Leading Change*. Boston, Harvard Business Press.

Kounios, J., Frymiare, J.L., Bowden, E.M., Fleck, J.I., Subramaniam, K., Parrish, T.B., & Jung-Beeman, M. (2006) The prepared mind: neural activity prior to problem presentation predicts solution by sudden insight. *Psychological Science*, Volume 17, pp. 882-890.

Langdridge, D. (2006) *Phenomenological psychology: theory, research and method*. Harlow, Pearson.

LeDoux, J. (1998) *The emotional brain: The mysterious underpinnings of emotional life*. New York, Simon & Schuster.

Levinson, A., Newton, S., & McDermott, M. (2007) What coaching can and cannot do for your organization. *Human Resource Planning*, June 2007.

Lewin, K. (1975) *Field theory in social science: selected theoretical papers*. Westport, Cn, Greenwood Press.

Lieberman, M. D. & Eisenberger, N. I. (2008) The pains and pleasures of social life: a social cognitive neuroscience approach. *NeuroLeadership Journal*, edition one, pp. 38-43.

Lieberman, M. D. (2009) The brain's braking system (and how to 'use your words' to tap into it). *NeuroLeadership Journal*, edition two, pp. 9-14.

Maslow, A. (1998) *Toward a Psychology of Being*. 3rd edition, Hoboken, Wiley.

McGregor, J. (2007) The Business Brain In Close-Up: can neuroscience offer insights into the 'soft' art of leadership? *BusinessWeek*, July 23 2007, pp. 68-69.

Moran, J. (2007) Coaching leaders to be coaches at EDS. *Global Business and Organizational Excellence*, Volume 26, Issue 6, pp. 55-62.

Nature Neuroscience, Editorial (2009) Connecting the Dots. *Nature Neuroscience*, vol. 12, no. 2, p. 99

NYU (2009) *Coaching certificate program* [Internet], New York, New York University School for Continuing and Professional Studies. Available from: <<http://www.scps.nyu.edu/course-detail/Y51.2420/20092/workplace-applications-of-coaching>> [Accessed on 13 August 2009].

Ochsner K. N., & Gross, J. J. (2005) *The cognitive control of emotion*. Trends in Cognitive Sciences, Volume 9(5), pp. 242-249.

Ochsner, K. N., & Lieberman, M. D. (2001) The emergence of social cognitive neuroscience. *American Psychologist*, Volume 56, pp. 717–734.

Ochsner, K. N. (2008) Personal communication, provided at an interview at Ochsner's home.

Ochsner, K. N. (2008b) Staying cool under pressure: insights from social cognitive neuroscience and their implications for self and society. *NeuroLeadership Journal*, edition one, pp. 3-19.

O'Connell, B. (2005) *Solution-Focused Therapy*, 2nd edition. Thousand Oaks, Sage Publications.

Rock, D. & Page, L. J. (2009) *Coaching with the brain in mind*, Hoboken, Wiley.

Perls, F., Hefferline, R. F. & Goodman, P. (1980) *Gestalt Therapy*. New York, Bantam.

Phillips, J. J. & Phillips, P. P. (2009) *ROI at work*. ASTD Press, Alexandria.

Pinker, S. (1999) *How the mind works*. New York, W. W. Norton & Co.

Posner, M.I., Rothbart, M. K., Sheese, B. E., Tang, Y. Y. (2007) The anterior cingulate gyrus and the mechanism of self-regulation. *Cognitive, Affective and Behavioral Neuroscience*, Volume 7(4), pp. 391-395.

Ratey, J. (2001) *A user's guide to the brain*. New York, Random House.

Reader comments (2007) *The Business Brain In Close-Up: Can neuroscience offer insights into the 'soft' art of leadership?* [Internet], New York, BusinessWeek.

Available from:

<http://www.businessweek.com/magazine/content/07_30/b4043084.htm>

[Accessed 13 August 2009].

Ringleb, A. (2006) personal communication by email.

Ringleb, A. H. & Pagone, M., (2009) The Cimba MBA Leadership Process. *NeuroLeadership Journal*, edition two, pp 42-52

Ringleb, A. & Rock, D. (2008) The emerging field of NeuroLeadership. *NeuroLeadership Journal*, edition one, pp. 3-19.

Ringleb, A., & Rock, D. (2008b) *Summary of the NeuroLeadership Institute Activities*. [Internet], Sydney, NeuroLeadership Institute. Available from: <<http://www.neuroleadership.org/institute/index.shtml>> [Accessed on 13 August 2009].

Robertson, I. (2002) *Opening the mind's eye: how images and language teach us to see*. New York, St. Martin's Press.

Rock, D. (2003) *Personal best: step-by-step coaching to achieve your personal and professional goals*. Sydney, Simon & Schuster Australia.

Rock, D. (2005) *Does internal coaching work?* RCS internal whitepaper. Sydney, RCS.

Rock, D. (2005b) *Early case studies with Centrelink*. RCS internal whitepaper. Sydney, RCS.

Rock, D. (2006) *Quiet Leadership: 6 steps to transforming performance at work*. New York, Collins.

Rock, D. (2006b) *What the coaches say*. RCS internal whitepaper. Sydney, RCS.

Rock, D. (2006c) *Testimonials and client feedback*. RCS internal whitepaper. Sydney, RCS.

Rock, D. (2007) *NeuroLeadership summit program*. NeuroLeadership Institute.

Rock, D. (2007b) *Coaching with the brain in mind*. *Coaching at Work Magazine*. Chartered Institute of Personnel development, April 2007.

Rock, D. (2008) *Theoretical Foundations of Coaching*. RCS Training Program. Sydney, RCS.

Rock, D. (2008b) *Presentation at Conference Board ROI Summit*. [Internet], New York, The Conference Board. Available from: <<http://www.conference-board.org/conferences/conference.cfm?id=1569>> [Accessed 13 August 2009].

Rock, D. (2008c) *Presentation at Conference Board Summits*. [Internet], New York, The Conference Board. Available from: <<http://www.conference-board.org/conferences/conference.cfm?id=1636>> [Accessed 13 August 2009].

Rock, D. (2008d) Scarf: a brain based model for collaborating with and influencing others. *NeuroLeadership Journal*, edition one, pp. 44-52.

Rock, D. (2009a) *Intensive Coach Training Program*. RCS training manual. Sydney, RCS.

Rock, D. (2009b) *Your brain at work*. New York, HarperBusiness.

Rock, D. (2009c) Managing with the brain in mind. *strategy+business magazine*, Issue 56, Autumn 2009, pp. 58-67.

Rock, D., & Donde, R. (2008) Driving organizational change with internal coaching programs: part one and part two. *Industrial and commercial training*, Volume 40, issue 1, pp. 10-18.

Rock, D., & Rule, R. (2007) *AIG retirement services case study*. RCS internal whitepaper. Sydney, RCS.

Rock, D., & Rule, R. (2008) *Memorial Sloane-Kettering Cancer Center Return on Investment Study*. RCS internal whitepaper. Sydney, RCS.

Rock, D., & Rule, M. (2008) *Performance Leadership*. RCS marketing document. Sydney, RCS.

Rock, D. & Schwartz, J.M. (2007) *Why Neuroscience Matters to Executives: The latest research on how the brain works unearths fresh insights into effective leadership* [Internet], New York, strategy+business magazine. Available from: <<http://www.strategy-business.com/li/leadingideas/li00021>> [Accessed 13 August 2009].

Rock, D. & Tang, Y.Y., (2009) The neuroscience of engagement. *NeuroLeadership Journal*, edition two, pp. 15-22.

Rogers, C. R. (1995) *Client-Centered Therapy: Its Current Practice, Implications, and Theory*. Philadelphia, Trans-Atlantic Publications.

Rose, L., Rule, M. & Donde, R. (2007) *DB Breweries Business Impact Study*. RCS internal whitepaper. Sydney, RCS.

Schuyler, D. (1991) *Practical Guide to Cognitive Therapy*. New York W. W. Norton & Company.

Schwartz, J. M. & Begley, S. (2003) *The Mind and the Brain*. New York, Harper Perennial.

Schwartz, J. M. (1996) *Brain Lock*. New York, Regan Books.

Seligman, M. E. P. (2005) *Authentic Happiness*. Glencoe, Free Press.

Siegel, D. J. (2007) Mindful Awareness, Mindsight, and Neural Integration. *The Humanistic Psychologist*, Volume 37, Issue 2 April 2009, pp. 137-158.

Siegel, D. J. (2007a) *The Mindful Brain: Reflection and attunement in the cultivation of well-being*. New York, W. W. Norton & Company.

Siegel, D. J. (2007b) Mindfulness training and neural integration: differentiation of distinct streams of awareness and the cultivation of well-being. *Social Cognitive & Affective Neuroscience*, Volume 2(4), pp. 259–263.

Siegel, D. J. (2008) *Mindsight Institute: About us* [Internet], Los Angeles, Mindsite Institute. Available from: <http://drdansiegel.com/page/about_us/> [Accessed 15 August 2009].

Subramaniam, K., Kounios, J., Parrish, T.B., & Jung-Beeman, M. (2009) A brain mechanism for facilitation of insight by positive affect. *Journal of Cognitive Neuroscience*, 21, pp. 415-432.

Tabibnia, G., Satpute, A. B., & Lieberman, M. D. (2008) The sunny side of fairness: Preference for fairness activates reward circuitry (and disregarding unfairness activates self-control circuitry). *Psychological Science*, Volume 19(4), pp. 339-347.

Tang, Y. Y., & Posner, M. I. (2008) The Neuroscience of Mindfulness. *NeuroLeadership Journal*, edition one, pp. 33-37.

Uddin, L. Q., Iacoboni, M., Lange, C., & Keenan, J. P. (2007) The self and social cognition: the role of cortical midline structures and mirror neurons. *Trends in Cognitive Sciences*, Volume 11(4), pp. 153-157.

Winston, R. (2004) *The Human Mind and how to make the most of it*. London, Transworld.

Zenger, J. R., Folkman, J. S. (2005) The Promise of Phase 3. *Training & Development*, Vol. 59 Issue 1, pp. 30-34,

APPENDIX 1: LIST OF PUBLISHED WORKS

Copies of books, papers and journals included in the original submission

BOOKS

- Book one: Personal Best
- Book two: Quiet Leadership
- Book three: Coaching with the Brain in Mind
- Book four: Your Brain at Work

PAPERS

- Paper one: The neuroscience of leadership
- Paper two: A brain-based approach to coaching
- Paper three: Driving change with internal coaching programs
- Paper four: SCARF: A brain-based model for collaborating with and influencing others (See NeuroLeadership Journal)
- Paper five: The emerging field of NeuroLeadership (See NeuroLeadership Journal)
- Paper six: Managing with the brain in mind

JOURNALS

The NeuroLeadership Journal

EDUCATIONAL RESOURCES

Coach training curriculum. (See www.ResultsCoaches.com)

NeuroLeadership Summit (See <http://www.neuroleadership.org/summits/2009-neuroleadership-summit.shtml>)

Post-graduate certificate in NeuroLeadership
(<http://www.neuroleadership.org/resources/graduate-certificate.shtml>)

This list does not include extensive works produced as commercial white papers and case studies as part of RCS' everyday business. These can be found in the references under my name.

APPENDIX 2: LIST OF ALL NEUROSCIENCE MENTORS

These are the people I learned most from over the five years from 2004 to 2009. The list includes people:

- I met with in person at least once
- I spoke with in person or by phone repeatedly over several years and/or corresponded by email with
- Whose main papers I read

The list is roughly in order of the number of interactions. The bottom 11 of these I interacted with once in an interview by phone.

1. Jeffrey M. Schwartz, PhD - neuroplasticity, general neuroscience education, philosophies of neuroscience and an understanding of the role of attention. Dr Schwartz was my primary mentor for around three years
2. Matt Lieberman, PhD – labeling, toward / away response, social neuroscience, fairness, social pain, research methods
3. Mark Jung-Beeman, PhD – neuroscience of insight
4. Yi-Yuan Tang, PhD – neuroscience of attention, culture and the brain
5. Evian Gordon, PhD – integrative neuroscience
6. Kevin Ochsner, PhD, social neuroscience, reappraisal
7. Daniel Siegel - neuroscience of mindfulness
8. James Gross – emotional regulation, reappraisal
9. Amy Arnsten, PhD – neuroscience of stress
10. Kirk Brown – mindfulness research
11. Henry Stapp, quantum physics and neuroscience
12. Stellan Ohlsson, insight researcher
13. Robert Coghill, PhD, neuroscience of expectations
14. Lila Davachi, PhD, neuroscience of memory
15. Golnaz Tabibnia, PhD social neuroscience, fairness
16. Craig Hassad, PhD, mindfulness
17. Jonah Lehrer, decision making
18. Naomi Eisenberger, PhD social neuroscience, social pain
19. Christian Keysers, PhD, social neuroscience, mirror neurons
20. Marco Iacoboni, social neuroscience, mirror neurons
21. Joseph Ledoux, PhD, amygdala research
22. Robert Wood, working memory research
23. John Cacioppo, PhD, social neuroscience
24. David Creswell, PhD, social neuroscience, mindfulness research
25. Jon Kabat-Zinn, mindfulness
26. Richard Davidson PhD, the neuroscience of mindfulness
27. John Teasdale, mindfulness research

28. Roy Baumeister, PhD, self regulation research
29. Mark Williams, PhD, mindfulness research
30. Jim Barrell, performance research
31. Linda Stone, workplace research

APPENDIX 3: LIST OF ALL PRINTED APPENDICES INCLUDED WITH THIS SUBMISSION

In addition to the published works, the following documents have been included in hard copy with this submission for the purposes of review. Most of these documents are not available in the public domain. They are listed alphabetically.

AIG ROI Study

Book proposal for Collins 2006

Book proposal for McGraw Hill 2007

Book proposal for Harvard Business School Press 2007

CIO Magazine: the new science of change article

Coaching leaders to be coaches at EDS

DB Breweries Impact Study

Does internal coaching work

Early case studies with Centrelink

EDS Brain Based Coaching Slides

EDS first study on coaching skills

First NeuroLeadership Summit Program 2007

IAG Coaching Brochure

Impact of internal coaching: what the coaches say 2006

Intensive Coach Training Participant Manual

Measuring the effectiveness of training internal coaches

MSK ROI Study

NeuroLeadership Summit Program Sydney 2008

NeuroLeadership Summit Program NYC 2008

NeuroLeadership Summit Program Los Angeles 2009

Performance Leadership Program

Post-graduate certificate in the Neuroscience of Leadership, brochure

Post-graduate certificate in the Neuroscience of Leadership, syllabus

RCS Workplace Coaching Testimonials 2006

SHRM The Brain at Work Article

Theoretical foundations of coaching